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How to keep the clock right by observations of the fixed ...

Thomas Warner

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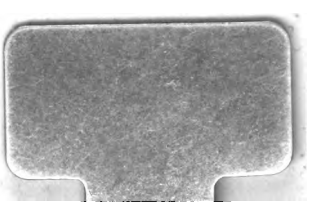

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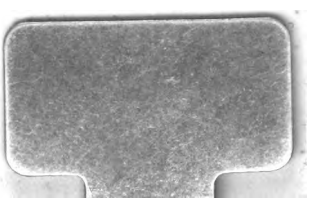

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HOW TO KEEP THE CLOCK RIGHT

BY OBSERVATIONS OF THE FIXED STARS

WITH A SMALL FIXED TELESCOPE.

TOGETHER WITH

TABLES OF STARS

ARRANGED TO SHOW, BY THE USE OF

A LITTLE ARITHMETIC,

THE MEAN SOLAR TIME OF THEIR APPARENT TRANSITS, TO THE END OF THE CENTURY.

BY THOMAS WARNER.

IMPROVED EDITION.

London:
WILLIAMS AND NORGATE,
14 HENRIETTA STREET, COVENT GARDEN, LONDON,
AND 20 SOUTH FREDERICK STREET, EDINBURGH.
1876.

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AND PARLIAMENT STREET

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PREFACE

TO THE

IMPROVED EDITION.

THE Improved Edition, as its name might imply, has been written not in consequence of the first Edition having been sold off; but to remedy the short-comings discovered in it. The chief short-coming was, that the Catalogue did not nearly contain all the stars likely to be observed with the small telescope. It was consequently necessary to examine the Catalogue before going to the telescope, and then to take care to observe the stars contained in the Catalogue. The Improved Edition removes that necessity; since the great majority of the stars satisfactorily observable with the small telescope will be found in Table IV.

The method of calculating the mean solar time of the apparent passage of a star across the fixed telescope has been improved. And some mistakes caused by confounding the Mean with the True Equinox have been corrected.

Since the first Edition was published, improvements have been made in the instrument. And a description of the improved instrument will be found in this Edition.

The following gratifying letters were received by the author after the publication of the first Edition:—

47 SUSSEX SQUARE, BRIGHTON.

Letter from the Rev. JAMES CHALLIS, M.A., F.R.S. *Plumian Professor of Astronomy in the University of Cambridge.*

13 TRUMPINGTON STREET, CAMBRIDGE: *July* 19, 1869.

DEAR SIR,

I beg to thank you for a copy of your work entitled 'How to keep the Clock Right.' I have given it the earliest attention I could, and am happy to say that I consider the proposed method of getting the time of day by observations of transits of Stars at night with a fixed telescope nearly in the meridian to be good in principle, and to be very practicable.

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By the help of the tables given in your work, the method appears to admit of quite sufficient accuracy for all horological purposes short of exact astronomical determinations. The mode of observing the transits by noting the time of reappearance from behind the first wire, and that of disappearance behind the second wire (as described in page 5), admits, I think, of great accuracy. It might be advisable to record the times by *counting* from the watch or chronometer (if it beats seconds or half seconds), in the ordinary way of taking transits at an observatory, without looking at the timepiece in the interval between the two transits at the parallel wires.

In case the supporting pillar may be susceptible of gradual change of position, would it not be desirable to make fresh determinations, from time to time, of the constant error mentioned at the bottom of page 6 ?

Believe me, dear Sir,

Yours very truly,

J. CHALLIS.

T. Warner, Esq.

Letter from SIR J. F. W. HERSCHEL, Bart., K.H. &c.

COLLINGWOOD: *July* 7, 1869.

DEAR SIR,

I beg to acknowledge your little book of tables for the reduction of observations of Stars by a small fixed telescope, which, so far as I can perceive, seems a very good way of keeping exact time (say in the country at a distance from any good clock), and very little costly* as well as attended with hardly more trouble than would be required for merely uncasing the telescope and looking through it. The only thing which I do not see any advantage in, is the introduction of the 'Dominical Letters,' which are always a great trouble, and of which I do not perceive the use, what is said in page [65] notwithstanding. In place of these complications of our Calendar, which not one person in a thousand understands, it would be well if every astronomical statement of an observation were accompanied with its Julian date in days hours, minutes, &c.

I remain, yours faithfully,

J. F. W. HERSCHEL.

T. Warner, Esq.

* It must however be remarked that the telescope described in this edition is more costly than that above referred to.

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CORRECTIONS.

Page *c* 5, K 1359, *instead of* N. P. D. 51° 50′ &c., *read* N. P. D. 50° 50′ &c.

Page *c* 9, K 392, *instead of* N. P. D. 50° 5′ &c., *read* N. P. D. 50° 15′ &c.

Page *c* 19, K 1029, *instead of* Mag. 9, *read* Mag. 6·8.

„ K 1045, *instead of* Mag. 7, *read* Mag. 9·1.

„ K 1048, *instead of* Mag. 9, *read* Mag. 7·4.

Page *c* 20, note K 1029 &c., *Add*—Substitute the above Mags. from 4 B. for those in the text, which are from K.

Page *c* 29, last line, *instead of* 3·02″, *read* 3·02 sec.

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HOW TO KEEP THE CLOCK RIGHT.

THE DIFFERENT METHODS usually adopted for keeping time with tolerable accuracy, by means of observations of the heavenly bodies, may, with some convenience, be divided into two great classes:—

First, observations of the *altitudes* of the objects observed. The advantages of this method are, that the instruments, sextants, &c. are portable, and can be used when other instruments would be unavailable, as on board-ship: amongst the disadvantages may be mentioned the trouble of reducing the observations.

The second class consists of observations on the *meridian*. This class must, however, be subdivided into two divisions: the first, when the observations are made with good transit instruments, which are occasionally examined for errors, and of which the errors are known and allowed for. The observations by such instruments are the most perfect of any—but the instruments are costly; they require and deserve careful treatment, and trouble and skill are necessary in detecting the errors.

The second subdivision comprises observations made with inferior transit instruments, or good ones which are not occasionally examined for errors. Fixed meridian lines, across which a bright spot of sunlight, from a small hole in the roof above, passes at apparent noon, and dipleidoscopes. The advantages of these instruments are, that if they have been once fixed nearly in the meridian (no very difficult matter in the case of the transit), they will continue to give fairly approximate time as long as they keep their position.

The disadvantages of these instruments are, that some of them (transits) are rather costly, and require considerable care; and the others, meridian lines and dipleidoscopes, are with difficulty fixed in the meridian, and when not fixed in the meridian, will give instrumental errors, differing with the

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different declinations of the objects observed, and all are liable to give erroneous results through the shifting or bending of what they are fixed to.

This last is the chief defect of the fixed telescope for observing the stars, which night after night, and year after year, pass across its field.

But when we consider that with an exposed pillar or building, if the sky has been clear during the morning, the sun has had all that time to bend the pillar, &c. to the west; and that the observation (if of the sun) will be taken when the bending is nearly at its maximum; and that if the morning has been dull, and the sun has come out only a short time before noon, the pillar, when the observation is taken, will be but little bent; it must be clear that meridian solar observations with exposed pillars, and fixed and untested instruments, are likely to give discordant results, and can hardly be sufficiently depended upon.

The case is different when fixed telescopes are used for observing the stars.

When the fixed telescope is used, even if the pillar has been exposed to the sun, and has been bent during the daytime, the interval which would generally elapse before the stars became visible, would allow the pillar to resume much of its proper form; but for observations in the zone, 50 to 53 N. P. D., it would often be easy to build the pillar so that it should never be exposed to the action of the sun, and consequently one important source of instrumental error would be much diminished, if not obviated altogether.

If, however, the ground upon which the pillar is built should be subject to much movement, the case is more difficult; sextants or examined transits could alone give fairly good results, and the examination of the transit must be unpleasantly frequent.

In the Isle of Wight there is a considerable district where a fixed instrument would be useless; on the other hand, the pillars of the Greenwich transit are known to have a very slow alternating movement, extending over many months, and affecting the time of the transit of a zenith star by less than a second.

I am unable to describe the form of telescope, &c., for fixing to a pillar or wall, which is at the same time the best to use, and the cheapest to make and fix. I have, however, tried a few experiments, and have in use one which certainly leaves little to be desired by the observer, but which would be all the

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better if it could be simplified and cheapened without losing in other respects.

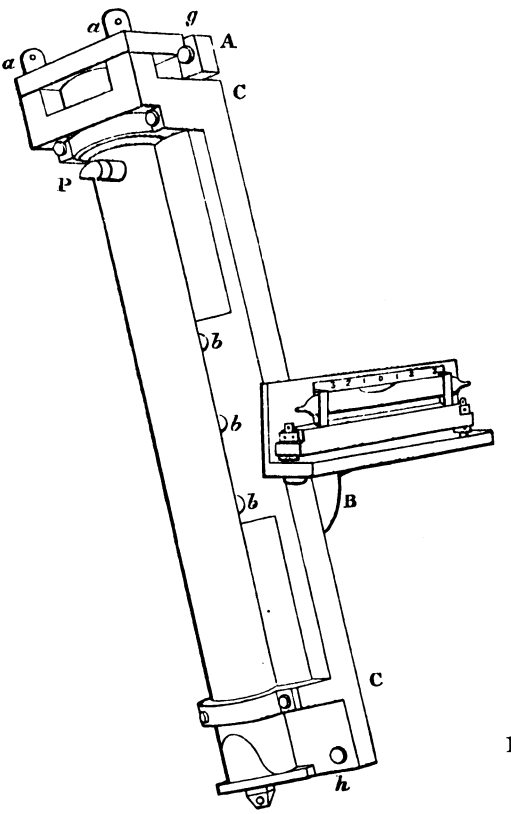

Fig. 1.

C C is a cast-iron cradle, into which the telescope is fastened at each end by a metal 'strap,' which, when not screwed down tight, will allow either the eye-tube or the object-tube to turn upon its axis independently of the other. The iron cradle is fastened, at the eye end, to the pillar by two bolts, one of which would be at *h*. At the object end the cradle is fastened to the connecting piece A by two bolts at *a* and *a*, and the connecting piece is fastened to the pillar by two bolts, one of which is shown at *g*. The advantages of this construction are:—First: An amount of elasticity in the direction of its length is imparted to the cradle, &c., so that no perceptible strain is thrown upon the pillar or the cradle by any difference in the expansion of the cradle and the material of the pillar. Second: In consequence of the play of an eighth to a quarter of an inch, which is given in the holes at *a a*, the construction

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enables the cradle to be firmly bolted to the pillar without fitting the one to the other, and without straining either. Third: This play in the holes will allow of a certain rough approximation of the telescope to the meridian required.

B in the figure is a cast-iron bracket, to carry a spirit-level, the bubble of which should move three-quarters of an inch to one inch and a half for a deflection of one minute of arc. The bracket is fastened to the cradle by a strong bolt passing through one of the holes *b b b*.

There is an arm not shown in the figure, which, when acted upon by two adjusting screws, will slowly turn the eye-tube upon its axis.

The eye-piece, which has a prism attached to it to facilitate the observations, slides in declination about an inch and a half, which gives a range in declination of about three degrees. Attached to the eye-piece, and in front of it, are two parallel wires, placed about ·02 inch apart, and at right-angles to the motion of the slide. Now, when these wires are so placed that the star passes between them, the slide which carries the eye-piece projects a certain distance beyond the telescope; then, by measuring the projection with a suitable scale, the declination of the star is shown with sufficient accuracy to lead to its identification.

In the eye-tube are placed two parallel wires, parallel also to the slide of the eye-piece: these, as they would probably not be in the meridian, I shall call *passage* wires, instead of *transit* wires. They are placed at such a distance from each other that a star is about twelve seconds (I should prefer eight or ten) from the time of its reappearance from behind the first wire to the time of its disappearance behind the second wire.

The resaon for having a pair of parallel wires in the centre, instead of a single one, is that an observation would, with this construction, be made by looking for the reappearance of the star from behind the first wire, taking the time of the reappearance from the watch, then seeing the star disappear behind the second wire and taking the time of the disappearance, and adopting the mean as the time of the passage. The eye has no difficulty in keeping itself fixed for two seconds while waiting for the reappearance of the star from behind the first wire, nor in finding the star between the two wires after it has been withdrawn to look at the watch.

The case is not so with the single wire; the star is invisible when the watch is first looked at, and the eye has to be

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directed on returning to the telescope, not to the star, but to that part of the wire where the star is to reappear; and when the star is small, it is frequently not caught at the right instant.

These wires are fixed by the common screw-head method; when they were first fixed, they passed in a straight line from screw-head to screw-head: but then it was found that the screw-heads prevented the eye-piece coming near enough to the wires, and, in order to remove that difficulty, the wires were raised above the plate nearly as high as the tops of the screw-heads by passing them over a 'bridge' at each end of the field of view. Each wire thus became bent in two places, as the string of a violin is, and the result was perfectly satisfactory.

Though not absolutely necessary, it is extremely desirable to have the field of the telescope sufficiently illuminated to see the wires without much difficulty. In order to obtain this illumination, a piece of common glass stirring-rod, such as chemists use, is roughened on the outside, ground as shown in the figure, and polished on the surfaces A and B.

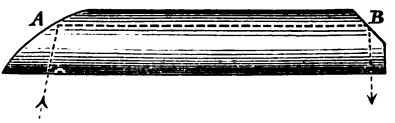

FIG. 2.

The end B is now passed a little way into the tube of the telescope, and the other end remains outside (as shown near P in fig. 1); and when observing, the light from the lanthorn, placed so as to see the watch-face, shines upon the roughened surface of the glass, and some of the light is successively reflected from the surfaces A and B, and passed down the tube of the telescope, where it serves to throw a little light over the 'field,' and to render the wires visible.

The telescope above described has a 2-inch objective, the glasses of which have contact surfaces, and are cemented. The focal length is 30 inches; the passage and declination wires are about ·003 to ·004 inch in thickness. The observations on p. 5*b* were actually made with it in 1874, and though that is probably the only occasion on which I have satisfactorily observed a star classed as 9th mag., I have often satisfactorily observed 8th mag. stars with it. The instrument was made by Messrs. Troughton & Simms.

With a smaller telescope I have used a ring of bright metal,

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the inner diameter of which was the same as that of the object-glass, and the outer about three-quarters of an inch more. The underside of this, when placed three or four inches in front of the object-glass, reflected the light from the lanthorn down the telescope.

The spirit-level of the fixed telescope has a little more to do than most spirit-levels: they show when the instrument is right; and when it is wrong, the *direction* of the error, but only very roughly its *extent*. The level of the fixed telescope has to measure the amount of the error. To do this, the bubble must be short, so that it may be able to traverse a considerable length of the reliable portion of the tube. A "chamber" level enables you to have a short bubble, and I think the best way of making it is: separate the chamber from the rest of the tube by a cork about half an inch long, and having a notch in the bottom for the spirit to pass through: the tube can then be closed in the usual manner by fusing the glass. Such a level I have found to answer satisfactorily.

The cork, when first placed in spirit, will impart to it some colouring-matter, part of which will form a sediment. The cork should consequently be soaked in spirit for two or three months before being placed in the tube.

In these latitudes, when the telescope is fixed for observing the stars in the following tables, the movement in the level of one minute of arc will indicate a variation of about five seconds in the time of the passage of the stars.

Before giving directions for fixing the telescope, I may as well remark that the pillar or wall to which the telescope is to be fixed should either have a very good foundation, or should have been standing long enough to have settled down into its permanent position: that in fixing the cradle to the pillar, or stones in the pillar, it seems better to pass the bolts through the stone, and then screw the cradle tight up to the face of the stone, than to fix the bolts in holes in the stone by any sort of plugging; for by the former method the iron, which is tough, holds the brittle stone, and in the latter the brittle stone has to hold the iron.

I must also remark that, after the telescope is fixed, it should be protected by a covering, which can easily be removed.

The telescope should be thus fixed: First, the optician should mark on the inner tube the distance it should be drawn out, so that the image of the star and the wires should be the same distance from the object-glass; second, the telescope should be

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fixed against the pillar, so as to show the zone of stars intended to be observed; third, the wires should be placed at right angles to the path of the stars. This must be done by comparing the *observed* interval between the passage of a star at the north end of the field and of one at the south end, with the interval given in some good Star Catalogue, or such tables as the following, which are more convenient; and having ascertained the difference of the intervals, and having calculated the proper correction, turning the diaphragm round the requisite amount. Example: suppose the *observed* interval between the transit across the wires of (in hour 2) 1 Gr. 250 and 3 Gr. 199 be 6 m. 14 s., and the interval shown by the tables be 6 m. 22·89 sec., the difference between the intervals will be 8·89 sec., which will have been caused by the wires not being at right angles to the path of the stars. Now, the difference in the NP Distances of the stars is 48′ and the space passed over by the stars in this list in one second of time is about equal to 12″, or one-fifth of a minute of arc; consequently, the wires diverge from the line at right angles to the path of the stars by an inclination of $8{\cdot}89 \div (48 \times 5)$, and consequently the southern end of the diaphragm must be turned to the west by that amount.

When the length of the arm from the centre of the eye-tube to the place where the adjusting screws act upon it, and also the value of a turn of the adjusting screws are known, the requisite turns of the adjusting screws can easily be calculated, and a fair approximation to the adjustment made at once.

I may as well say that an inclination of 1 in 900 to the line at right angles to the path of the stars would make a difference of about one second in the passages of two stars, the N. P. D.'s of which are respectively 50° and 53°.

When the wires have been placed nearly at right angles to the path of the stars, it would be better not to alter the position till the error had been estimated by the average of several double observations, shown to have been sufficiently well taken by their tolerable agreement with each other.

It is well to remember that errors may be so small that it would be better to allow for them than to attempt to correct them.

Having adjusted the wires at right angles to the path of the stars, or parallel to a meridian, the fourth and last step is to ascertain the error of the instrument: that must be done by comparing the time (according to a watch or chronometer the

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error of which is known) at which a star is observed to pass the wires, with the time the star should cross the meridian according to the tables. Thus, supposing on some night a star is observed to pass the wires at 8h. 10m. 20sec., and according to the tables it should pass the meridian at 8h. 9m. 10sec., the error of the instrument will be + 1m. 10sec., and this will be the same for all stars and for all time till the telescope from any cause becomes moved.

This instrumental error, when combined with the mean solar time of the apparent transit, on any day, of any of the stars in the following list, which may be easily found from the tables, will give the mean solar time of the star's *passing the telescope;* and from that the error of the clock or chronometer may be discovered and corrected.

An objection may be reasonably urged against the use of such telescopes—that it is impossible to depend upon the perfect rigidity of the pillars, or upon the stability of the ground they stand upon; no doubt it is so. At the same time, there is reason to think that generally the movements are very small, and the most important of them (that of level) can be to a certain extent detected and allowed for.

The spirit-level would not, of course, show any change in azimuth; but in these latitudes, and with stars so near the zenith as those in the list, the change in time produced by azimuthal movement is very much less than that produced by an equal change in level; and it is not probable that in a detached pillar there would be any azimuthal change, unaccompanied by a much greater change in level—a change which would be detected by the spirit-level, and would indicate that the pillar, or the ground it stood upon, was unsuitable for a fixed instrument of any sort, at least without frequent testing.

Such is the fixed telescope, admitting, no doubt, of increased simplicity in construction, but, even as it is, very simple. It has no working parts affecting the accuracy of the observations taken with it, and is not likely to be disarranged by unskilful usage. *It will not find the time*, but the time having been once found, I believe it will *keep* it in a very satisfactory manner; and though it may take something from Astronomy, and give little in return, it is calculated to be of no small service to Horology. The tables of stars to be observed with it have been carefully prepared from several catalogues, including the best,* and have been arranged so as to be readily used

* I have not, however, taken any stars from the famous Poulkova Catalogue,

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by those who are not astronomers, and whose acquaintance with mathematics is limited to the knowledge of a little arithmetic. With these facilities for reducing the observations of the fixed stars to mean solar time, is it too much to hope that others may improve upon the instrument?

'Ascensions Droites and Declinaisons Moyennes des Étoiles Principales pour l'Epogue 1845' (Petersburg, 1869–72); for it was not till after the work was far advanced that a friend sent me a copy from the Director of the Observatory, General O. Struve. I have, however, compared the 'right ascensions' of the stars (18) in the following tables, which are found in the Poulkova Catalogue, and find that the Poulkova R.A.s differ from those of the Catalogues from which the stars' places have been taken (Greenwich Catalogues), in four cases by less than 2-10ths of a second, and in the other fourteen cases by less than 1-10th.

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RULES

AND

EQUINOX TABLES.

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RULES.

RULE 1. To find the mean solar time of the transit of the mean equinox at Greenwich for any day down to the end of the year 1925.

Add the equinox correction from Table I*a*. to the time opposite the day in Table I., and the sum will be the time required.

Example:—Required the M.S.T. of the transit of the M.E. at G. on Ap. 9, 1875.

From T. I*a*.	2 44·63	
T. I.	10 48 8·87	A.M.
	10 50 53·50	A.M. which is the time required.

RULE 2. To find the equinox correction for any place, of which the longitude east or west of Greenwich is known.

Find from Table I*b*. the correction due to its longitude, and when the longitude is east of Greenwich add it to the quantities in Table I*a*., and when the longitude is west subtract it.

Examples:—Required the equinox corrections for Petersburg 30° 18′·4 east, and Dublin 6° 20′·5 west, for the year 1875.

PETERSBURG.			DUBLIN.		
From T. I*b*.	30°	19·6591	From T. I*b*.	6°	3·9318
	10′	·1092		20′	·2184
	8′	·0874		·5′	·0055
	·4′	·0044			4·1557−
		19·8601+			
From T. I*a*. 1875 .	2	44·63	From T. I*a*. 1875 .	2	44·63
E.C. for Petersburg 1875	3	4·49	E.C. for Dublin 1875 .	2	40·47

RULE 3. To find the *local* mean solar time of the transit of the mean equinox at any place, the longitude of which east or west of Greenwich is known, on any day.

After finding the local equinox correction by Rule 2, combine it with the time opposite the day in Table I., and the combination will be the time required.

Examples:—Required the Petersburg mean solar time of the transit of the mean equinox at Petersburg on April 9, 1875, and, similarly, the Dublin mean time of the transit at Dublin.

	at Petersburg	at Dublin
By examples to Rule 2 E.C. for 1875 .	3 4·49	2 40·47
From Table I.	10 48 8·87	10 48 8·87
The local mean time of the transits .	10 51 13·36	10 50 49·34 A.M.

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RULE 4. To find the mean Right Ascension of a star for the beginning of any year, say $1875+y$ (the R.A. to be expressed in mean solar time).

Add to the mean R.A. in Table IV. the Annual Variation of the star multiplied by y, and, when greater accuracy is sought, combining therewith, either by addition or subtraction, as the sign on the top of the column will show, the star's Secular Variation multiplied by $y^2 \div 200$.

Example:—Required the mean R.A. of 4 G. 1270 for the beginning of 1887.

From Table IV. mean R.A. for 1875 . . .	10 18	57·33
+ 12 × 3·481 sec.		41·772+
−, 12 × 12 ÷ 200, or, ·72, × ·030 . . .		·022−
	10 19	39·08

which will be the mean R.A. of the star for the beginning of 1887.

RULE 5. To find the *apparent* Right Ascension of a star for any date *measured from the mean equinox*, and expressed in mean solar time.

After finding the mean R.A. of the star for the beginning of the year by Rule 4, add to it, from Tables II. and III., the quantities corresponding to its R.A. and to the date, interpolating if necessary; and, after deducting 11 seconds, the remainder will be the star's apparent R.A. measured from the mean equinox, and expressed in mean solar time.

Example:—Required the apparent R.A. of 4 G. 1270 for April 9, 1887.

By example to Rule 4 the mean R.A. for the beginning of 1887 is	10 19	39·08
From Table II.		12·06+
„ „ III.		·55+
		11·00−
The apparent R.A. for April 9, 1887	10 19	40·69

RULE 6. To find the mean solar time of the apparent transit of a star on any day.

Find the apparent Right Ascension of the star by Rule 5, and add to it the mean solar time of the transit of the mean equinox, found by Rule 3, for the given day, or for the day before, as the case may require.

Example:—Required the local mean solar time of the apparent transit at Dublin of 4 G. 1270 on April 9, 1887.

From example to Rule 5 the apparent R.A. of the star is	10 19	40·69
For the transit of the equinox at Greenwich, T. I*a*., 1887	2	22.55
Correction for longitude of Dublin (see Rule 2) . .		4.16−
Equinox correction for Dublin, 1887	2	18·39
T. I., April 9	10	48 8·87 A.M.
Apparent R.A. of star	10	19 40·69
The local mean time of the apparent transit of star .	9	10 7·95 P.M.

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RULE 7. To find the error of a fixed telescope from the meridian.

With a chronometer, which will give local mean time, the time must be observed when one or more stars pass* the fixed telescope, and this time must be compared with the mean solar time of the star's apparent transit* across the meridian, as shown by Rule 6, and the difference will give the error of the instrument from the meridian.

Example:—Should the star 4 G. 1270 be seen on April 9, 1887, to pass a fixed telescope at Dublin at 9 10 20·00 P.M., when the mean time of its transit is 9 10 7.95 P.M., the difference, 12·05 sec., will be the instrument's error from the meridian, and all stars will pass the fixed telescope 12·05 sec. after their time of transit.

RULE 8. To find the instrument correction for keeping conventional time, such as Greenwich time for any part of England, or Dublin time for any part of Ireland, with the fixed telescope.

Observe by a chronometer which will give the conventional time the conventional time when one or more stars pass the fixed telescope, and then, without taking notice of any difference in longitude, find by Rule 6 the mean solar time of the star's apparent transit at Greenwich, and the difference will be the instrument correction.

Example:—Supposing it should be required to keep Greenwich time at Exeter; suppose, too, that the star 4 G. 1270 should be seen to pass the fixed telescope at 9 10 20 P.M. on April 9, 1887, and, as by example to Rule 6, omitting the correction for the longitude of Dublin, its transit will take place at Greenwich at 9 10 12·11 P.M., the *instrument correction* for Greenwich time will be the difference between 9 10 20 and 9 10 12·11, or + 7·89 sec.; and all stars will pass the fixed telescope 7·89 sec. after the time of their transit at Greenwich.

RULE 9. To utilise the observations with the fixed telescope for keeping conventional time.

Since it will be necessary to combine the quantities from Tables I., I*a*., II., III., and IV., and also the instrument correction and — 11 seconds, it will be best to combine into one quantity, at the beginning of each year, the instrument correction, — 11 seconds, and the equinox correction for the year from Table I*a*. This combination may be called the *general correction for the year*. Now, when the observations have been taken and recorded, find the time of the previous passage of the equinox by combining the general correction for the year with the time given in Table I. for that day, or for the day before, as the case may require. This combination may be called the *general correction for the night*. Subtracting it roughly from the middle time of the observations, the remainder will show the Right Ascensions of the stars observed, with sufficient accuracy to take out the proper quantities from Tables II. and III., and, adding these quantities to the general correction for the night, we shall have the *general correction for the observations*. The stars observed should then be identified

* I shall use the words *pass* and *passage* when speaking of the star's crossing the wires of the fixed telescope; and the word *transit*, as is usual, to refer the star's crossing the meridian.

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either by their north polar distances, magnitudes, relative positions, or other characteristics, and the Right Ascension of each star for the beginning of the year (see Rule 4), when added to the general *correction for the observations*, will give the mean solar time of its apparent passage through the fixed telescope; and this, when compared with the observed time, will show the error of the clock or watch.

Example:—Suppose that the year is 1878, and that the instrument correction is + 1 m. 10 sec., we should then have to form the general correction for the year. . . . . .

T. I*a*. 1878	1 40·13
Inst. Cor. .	1 10·00
The 11 s. —	11
G.C. for year	2 39·13

Suppose, too, that on April 15 the stars *a*, *b*, *c*, and *d* should be observed to pass the fixed telescope at the undermentioned times, and that their appearances, and N.P.D.s were as follows:—

	a	*b*	*c*	*d*
Time of passage .	11 3 36·00	11 7 2·00	11 8 45·00	11 12 10·00
Magnitude & N.P.D.	Good; 50° 0′	—; 53° 0′	Good; 51° 50′	Small; 51° 2c′

Adding now the general correction for the year to the time opposite April 15 in T. I., we get the general correction for the *night*. Subtracting this from the mean of the observed times we get 12 40—45 as the roughly approximate R.A.s of the stars observed. Taking now the proper quantities from Ts. II. and III. for R.A., 12 40—45 and April 15, 1878, and adding them to the general correction for the night, we get the *general correction for the observations*. Turning now to T. IV., about 12 35—50, we find the following stars; and, bringing up their mean places to 1878, and adding to each of their places, so found, the *general correction for the observations*, we get the mean solar time the star passed the fixed telescope; and the difference between that time and the observed time will give the error of the watch or clock:—

G.C. for year	2 39·13
T. I. .	10 24 33·42
A.M.	10 27 12·55

G.C.N. .	10 27 12·55
T. II. .	12·38
T. III. .	1·29
G.C.O. .	10 27 26·22

Name and number .	*a*=2 R. 1227	*b*=W. 5345	*c*=1 G. 1028	*d*=K. 947
Mag. and N.P.D. in 1875	**6·2**; 50° 3′	**7·8**; 53° 0′	**6**; 51° 49′	**9**; 51° 22′
R.A. in 1875 . .	12 37 00·00	12 40 25·47	12 42 9·19	12 45 33·38
3 years' pre. . . .	8·53	8·64	8·59	8·53
G.C.O.	10 27 26·22	10 27 26·22	10 27 26·22	10 27 26·22
Mean time of passage .	11 4 34·75	11 8 0·33	11 9 44·00	11 13 8·13
Observed time . .	11 3 36·00	11 7 2·00	11 8 45·00	11 12 10·00
Dif. or error of watch .	−58·75	−58·33	−59·00	−58·13

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TABLE I.

JANUARY LEAP YEAR					FEBRUARY LEAP YEAR					MARCH LEAP YEAR				
D. L.	Day	P.M. h	m	s	D. L.	Day	P.M. h	m	s	D. L.	Day	P.M. h	m	s
A	1	5	13	28·00	D	1	3	11	34·81	E	1	1	17	33·43
B	2	5	9	32·09	E	2	3	7	38·90	F	2	1	13	37·52
C	3	5	5	36·18	F	3	3	3	42·99	G	3	1	9	41·61
D	4	5	1	40·27	G	4	2	59	47·08	A	4	1	5	45·70
E	5	4	57	44·36	A	5	2	55	51·17	B	5	1	1	49·80
F	6	4	53	48·45	B	6	2	51	55·26	C	6	0	57	53·89
G	7	4	49	52·54	C	7	2	47	59·35	D	7	0	53	57·98
A	8	4	45	56·63	D	8	2	44	3·44	E	8	0	50	2·07
B	9	4	42	0·72	E	9	2	40	7·53	F	9	0	46	6·16
C	10	4	38	4·81	F	10	2	36	11·62	G	10	0	42	10·25
D	11	4	34	8·91	G	11	2	32	15·71	A	11	0	38	14·34
E	12	4	30	13·00	A	12	2	28	19·80	B	12	0	34	18·43
F	13	4	26	17·09	B	13	2	24	23·89	C	13	0	30	22·52
G	14	4	22	21·18	C	14	2	20	27·98	D	14	0	26	26·61
A	15	4	18	25·27	D	15	2	16	32·07	E	15	0	22	30·70
B	16	4	14	29·36	E	16	2	12	36·17	F	16	0	18	34·79
C	17	4	10	33·45	F	17	2	8	40·26	G	17	0	14	38·88
D	18	4	6	37·54	G	18	2	4	44·35	A	18	0	10	42·97
E	19	4	2	41·63	A	19	2	0	48·44	B	19	0	6	47·06
F	20	3	58	45·72	B	20	1	56	52·53	C	20	0	2	51·15
												P.M.		
G	21	3	54	49·81	C	21	1	52	56·62			A.M.		
A	22	3	50	53·90	D	22	1	49	0·71	D	21	11	58	55·24
B	23	3	46	57·99	E	23	1	45	4·80	E	22	11	54	59·33
C	24	3	43	2·08	F	24	1	41	8·89	F	23	11	51	3·43
D	25	3	39	6·17	G	25	1	37	12·98	G	24	11	47	7·52
E	26	3	35	10·26	A	26	1	33	17·07	A	25	11	43	11·61
F	27	3	31	14·35	B	27	1	29	21·16	B	26	11	39	15·70
G	28	3	27	18·44	C	28	1	25	25·25	C	27	11	35	19·79
A	29	3	23	22·54	D	29	1	21	29·34	D	28	11	31	23·88
B	30	3	19	26·63				P.M.		E	29	11	27	27·97
C	31	3	15	30·72						F	30	11	23	32·06
		P.M.								G	31	11	19	36·15
												A.M.		

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TABLE I.

APRIL					MAY					JUNE				
D.L.	Day	A.M. h	m	s	D.L.	Day	A.M. h	m	s	D.L.	Day	A.M. h	m	s
G	1	11	19	36·15	B	1	9	21	38·87	E	1	7	19	45·67
A	2	11	15	40·24	C	2	9	17	42·96	F	2	7	15	49·76
B	3	11	11	44·33	D	3	9	13	47·05	G	3	7	11	53·85
C	4	11	7	48·42	E	4	9	9	51·14	A	4	7	7	57·94
D	5	11	3	52·51	F	5	9	5	55·23	B	5	7	4	2·04
E	6	10	59	56·60	G	6	9	1	59·32	C	6	7	0	6·13
F	7	10	56	0·69	A	7	8	58	3·41	D	7	6	56	10·22
G	8	10	52	4·78	B	8	8	54	7·50	E	8	6	52	14·31
A	9	10	48	8·87	C	9	8	50	11·59	F	9	6	48	18·40
B	10	10	44	12·96	D	10	8	46	15·68	G	10	6	44	22·49
C	11	10	40	17·05	E	11	8	42	19·77	A	11	6	40	26·58
D	12	10	36	21·15	F	12	8	38	23·86	B	12	6	36	30·67
E	13	10	32	25·24	G	13	8	34	27·95	C	13	6	32	34·76
F	14	10	28	29·33	A	14	8	30	32·04	D	14	6	28	38·85
G	15	10	24	33·42	B	15	8	26	36·13	E	15	6	24	42·94
A	16	10	20	37·51	C	16	8	22	40·22	F	16	6	20	47·03
B	17	10	16	41·60	D	17	8	18	44·31	G	17	6	16	51·12
C	18	10	12	45·69	E	18	8	14	48·41	A	18	6	12	55·21
D	19	10	8	49·78	F	19	8	10	52·50	B	19	6	8	59·30
E	20	10	4	53·87	G	20	8	6	56·59	C	20	6	5	3·39
F	21	10	0	57·96	A	21	8	3	0·68	D	21	6	1	7·48
G	22	9	57	2·05	B	22	7	59	4·77	E	22	5	57	11·57
A	23	9	53	6·14	C	23	7	55	8·86	F	23	5	53	15·67
B	24	9	49	10·23	D	24	7	51	12·95	G	24	5	49	19·76
C	25	9	45	14·32	E	25	7	47	17·04	A	25	5	45	23·85
D	26	9	41	18·41	F	26	7	43	21·13	B	26	5	41	27·94
E	27	9	37	22·50	G	27	7	39	25·22	C	27	5	37	32·03
F	28	9	33	26·59	A	28	7	35	29·31	D	28	5	33	36·12
G	29	9	29	30·68	B	29	7	31	33·40	E	29	5	29	40·21
A	30	9	25	34·78	C	30	7	27	37·49	F	30	5	25	44·30
		A.M			D	31	7	23	41·58			A.M.		
							A.M.							

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TABLE I.

JULY LEAP YEAR					AUGUST LEAP YEAR					SEPTEMBER LEAP YEAR				
D. L.	Day	A.M. h	m	s	D. L.	Day	A.M. h	m	s	D. L.	Day	A.M. h	m	s
A	1	5	17	52·48	D	1	3	15	59·29	G	1	1	14	6·09
B	2	5	13	56·57	E	2	3	12	3·38	A	2	1	10	10·18
C	3	5	10	0·66	F	3	3	8	7·47	B	3	1	6	14·28
D	4	5	6	4·75	G	4	3	4	11·56	C	4	1	2	18·37
E	5	5	2	8·84	A	5	3	0	15·65	D	5	0	58	22·46
F	6	4	58	12·93	B	6	2	56	19·74	E	6	0	54	26·55
G	7	4	54	17·02	C	7	2	52	23·83	F	7	0	50	30·64
A	8	4	50	21·11	D	8	2	48	27·92	G	8	0	46	34·73
B	9	4	46	25·20	E	9	2	44	32·01	A	9	0	42	38·82
C	10	4	42	29·29	F	10	2	40	36·10	B	10	0	38	42·91
D	11	4	38	33·39	G	11	2	36	40·19	C	11	0	34	47·00
E	12	4	34	37·48	A	12	2	32	44·28	D	12	0	30	51·09
F	13	4	30	41·57	B	13	2	28	48·37	E	13	0	26	55·18
G	14	4	26	45·66	C	14	2	24	52·46	F	14	0	22	59·27
A	15	4	22	49·75	D	15	2	20	56·55	G	15	0	19	3·36
B	16	4	18	53·84	E	16	2	17	0·65	A	16	0	15	7·45
C	17	4	14	57·93	F	17	2	13	4·74	B	17	0	11	11·54
D	18	4	11	2·02	G	18	2	9	8·83	C	18	0	7	15·63
E	19	4	7	6·11	A	19	2	5	12·92	D	19	0	3	19·72
F	20	4	3	10·20	B	20	2	1	17·01				A.M.	
G	21	3	59	14·29	C	21	1	57	21·10				P.M.	
A	22	3	55	18·38	D	22	1	53	25·19	D	19	11	59	23·81
B	23	3	51	22·47	E	23	1	49	29·28	E	20	11	55	27·91
C	24	3	47	26·56	F	24	1	45	33·37	F	21	11	51	32·00
D	25	3	43	30·65	G	25	1	41	37·46	G	22	11	47	36·09
E	26	3	39	34·74	A	26	1	37	41·55	A	23	11	43	40·18
F	27	3	35	38·83	B	27	1	33	45·64	B	24	11	39	44·27
G	28	3	31	42·92	C	28	1	29	49·73	C	25	11	35	48·36
A	29	3	27	47·02	D	29	1	25	53·82	D	26	11	31	52·45
B	30	3	23	51·11	E	30	1	21	57·91	E	27	11	27	56·54
C	31	3	19	55·20	F	31	1	18	2·00	F	28	11	24	0·63
			A.M.					A.M.		G	29	11	20	4·72
										A	30	11	16	8·81
													P.M.	

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TABLE I.

OCTOBER LEAP YEAR					NOVEMBER LEAP YEAR					DECEMBER LEAP YEAR				
D.L.	Day	P.M. h	m	s	D.L.	Day	P.M. h	m	s	D.L.	Day	P.M. h	m	s
B	1	11	12	12·90	E	1	9	10	19·71	G	1	7	12	22·42
C	2	11	8	16·99	F	2	9	6	23·80	A	2	7	8	26·52
D	3	11	4	21·08	G	3	9	2	27·89	B	3	7	4	30·61
E	4	11	0	25·17	A	4	8	58	31·98	C	4	7	0	34·70
F	5	10	56	29·26	B	5	8	54	36·07	D	5	6	56	38·79
G	6	10	52	33·35	C	6	8	50	40·16	E	6	6	52	42·88
A	7	10	48	37·44	D	7	8	46	44·25	F	7	6	48	46·97
B	8	10	44	41·54	E	8	8	42	48·34	G	8	6	44	51·06
C	9	10	40	45·63	F	9	8	38	52·43	A	9	6	40	55·15
D	10	10	36	49·72	G	10	8	34	56·52	B	10	6	36	59·24
E	11	10	32	53·81	A	11	8	31	0·61	C	11	6	33	3·33
F	12	10	28	57·90	B	12	8	27	4·70	D	12	6	29	7·42
G	13	10	25	1·99	C	13	8	23	8·79	E	13	6	25	11 51
A	14	10	21	6·08	D	14	8	19	12·89	F	14	6	21	15·60
B	15	10	17	10·17	E	15	8	15	16·98	G	15	6	17	19·69
C	16	10	13	14·26	F	16	8	11	21·07	A	16	6	13	23·78
D	17	10	9	18·35	G	17	8	7	25·16	B	17	6	9	27·87
E	18	10	5	22·44	A	18	8	3	29·25	C	18	6	5	31·96
F	19	10	1	26·53	B	19	7	59	33·34	D	19	6	1	36·05
G	20	9	57	30·62	C	20	7	55	37·43	E	20	5	57	40·15
A	21	9	53	34·71	D	21	7	51	41·52	F	21	5	53	44·24
B	22	9	49	38·80	E	22	7	47	45·61	G	22	5	49	48·33
C	23	9	45	42·89	F	23	7	43	49·70	A	23	5	45	52·42
D	24	9	41	46·98	G	24	7	39	53·79	B	24	5	41	56·51
E	25	9	37	51·07	A	25	7	35	57·88	C	25	5	38	0·60
F	26	9	33	55·16	B	26	7	32	1·97	D	26	5	34	4·69
G	27	9	29	59·26	C	27	7	28	6·06	E	27	5	30	8·78
A	28	9	26	3·35	D	28	7	24	10·15	F	28	5	26	12·87
B	29	9	22	7·44	E	29	7	20	14·24	G	29	5	22	16·96
C	30	9	18	11·53	F	30	7	16	18·33	A	30	5	18	21·05
D	31	9	14	15·62						B	31	5	14	25·14
		P.M.					P.M.					P.M.		

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EQUINOX CORRECTIONS FOR GREENWICH, ALWAYS +.

YEAR	Dominical Letter	YEARS Common m. sec.	YEARS Leap m. sec.	YEAR	Dominical Letter	YEARS Common m. sec.	YEARS Leap m. sec.
1875	C	2 44·63		1900	G	2 57·60	
1876	B		3 41·77	01	F	3 54·74	
77	G	0 42·99		02	E	4 51·87	
78	F	1 40·13		03	D	5 49·01	
79	E	2 37·27		1904	C		6 46·15
1880	D		3 34·40	05	A	3 47·38	
81	B	0 35·63		06	G	4 44·51	
82	A	1 32·77		07	F	5 41·65	
83	G	2 29·91		1908	E		6 38·79
1884	F		3 27·04	09	C	3 40·02	
85	D	0 28·27		10	B	4 37·15	
86	C	1 25·41		11	A	5 34·29	
87	B	2 22·55		1912	G		6 31·43
1888	A		3 19·68	13	E	3 32·66	
89	F	0 20·91		14	D	4 29·79	
90	E	1 18·05		15	C	5 26·93	
91	D	2 15·19		1916	B		6 24·07
1892	C		3 12·32	17	G	3 25·30	
93	A	0 13·55		18	F	4 22·43	
94	G	1 10·69		19	E	5 19·57	
95	F	2 7·82		1920	D		6 16·71
1896	E		3 4·96	21	B	3 17·93	
97	C	0 6·19		22	A	4 15·07	
98	B	1 3·33		23	G	5 12·21	
99	A	2 0·46		1924	F		6 9·35
1900	G	2 57·60		25	D	3 10·57	

TABLE I*b*.—CORRECTION FOR LONGITUDE.

LONGITUDE °	CORRECTION seconds	LONGITUDE ′	CORRECTION seconds
1	·65530	1	0·01092
2	1·31061	2	0·02184
3	1·96591	3	0·03277
4	2·62122	4	0·04369
5	3·27652	5	0·05461
6	3·93182	6	0·06553
7	4·58713	7	0·07645
8	5·24243	8	0·08737
9	5·89774	9	0·09830
10	6·55304	10	0·10922

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EQUATIONS OF THE EQUINOXES.

These corrections, combined with the 'results' from Tables I., I*a*., and I*b*., give the mean time of the transit of the *True* Equinox.

Jan. 1	Aug. 7	March 14	sec.
1875	1893	1912	+ 0·40
76	94	13	+ 0·06
77	95	14	− 0·28
78	96	15	− 0·60
79	97	16	− 0·85
1880	1898	1917	− 1·01
81	99	18	− 1·05
82	1900	19	− 0·98
83	01	20	− 0·79
84	02	21	− 0·51
1885	1903	1922	− 0·17
86	04	23	+ 0·19
87	05	24	+ 0·53
88	06	25	+ 0·80
89	07	26	+ 0·98
1890	1908	1927	+ 1·05
91	09	28	+ 1·00
92	10	29	+ 0·84
93	11	30	+ 0·58
94	12	31	+ 0·27
1895	1913	1932	− 0·08
96	14	33	− 0·41
97	15	34	− 0·70
98	16	35	− 0·92
99	17	36	− 1·04
1900	1918	1937	− 1·04

The dates nearly corresponding to the decimal parts of the year :—

·1	February	6
·2	March	14
·3	April	20
·4	May	26
·5	July	2
·6	August	7
·7	September	13
·8	October	19
·9	November	25

		sec.
Jan.	1	− 0·03
	11	− 0·05
	21	− 0·07
	31	− 0·08
Feb.	10	− 0·08
	20	− 0·06
March	2	− 0·04
	12	− 0·02
	22	+ 0·01
April	1	+ 0·03
	11	+ 0·05
	21	+ 0·07
May	1	+ 0·08
	11	+ 0·08
	21	+ 0·07
	31	+ 0·05
June	10	+ 0·03
	20	+ 0·00
	30	− 0·02
July	10	− 0·05
	20	− 0·06
	30	− 0·07
Aug.	9	− 0·08
	19	− 0·07
	29	− 0·06
Sept.	8	− 0·04
	18	− 0·01
	28	+ 0·02
Oct.	8	+ 0·04
	18	+ 0·06
	28	+ 0·07
Nov.	7	+ 0·08
	17	+ 0·07
	27	+ 0·06
Dec.	7	+ 0·04
	17	+ 0·01
	27	− 0·02
	37	− 0·04

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TABLES II. AND III.

AND

TABLE IV.

THE CATALOGUE

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		0h.R.A.	1h.R.A.			0h.R.A.	1h.R.A.			0h.R.A.	1h.R.A.
		sec.	sec.			sec.	sec.			sec.	sec.
Jan.	1...	9·72	10·18	May	1...	9·82	9·64	Sept.	8...	13·64	13·68
	11...	9·53	9·98		11...	10·11	9·88		18...	13·77	13·88
	21...	9·35	9·78		21...	10·42	10·15		28...	13·85	14·04
	31...	9·20	9·60		31...	10·76	10·46	Oct.	8...	13·89	14·16
Feb.	10...	9·08	9·44	June	10...	11·10	10·79		18...	13·88	14·24
	20...	9·00	9·31		20...	11·45	11·13		28...	13·83	14·27
Mar.	2...	8·97	9·21		30...	11·80	11·49	Nov.	7...	13·74	14·26
	12...	8·99	9·16	July	10...	12·14	11·84		17...	13·62	14·20
	22...	9·06	9·16		20...	12·46	12·19		27...	13·47	14·10
April	1...	9·18	9·20		30...	12·76	12·54	Dec.	7...	13·29	13·97
	11...	9·35	9·30	Aug.	9...	13·03	12·86		17...	13·10	13·81
	21...	9·56	9·45		19...	13·27	13·16		27...	12·90	13·63
May	1...	9·82	9·64		29...	13·48	13·44		37...	12·70	13·43
				Sept.	8...	13·64	13·68				

TABLE III.

Jan. 1	R. A. 0 h. sec.	R. A. 1 h. sec.	Aug. 12	Jan. 1	R. A. 0 h. sec.	R. A. 1 h. sec.	Aug. 12	Jan. 1	R. A. 0 h. sec.	R. A. 1 h. sec.	Aug. 12
1873	0·76	0·69	1891	1882	1·19	1·27	1900	1891	0·85	0·77	1909
1874	0·63	0·58	1892	1883	1·33	1·39	1901	1892	0·71	0·64	1910
1875	0·55	0·53	1893	1884	1·43	1·47	1902	1893	0·60	0·56	1911
1876	0·51	0·52	1894	1885	1·49	1·49	1903	1894	0·53	0·52	1912
1877	0·53	0·57	1895	1886	1·49	1·46	1904	1895	0·51	0·54	1913
1878	0·60	0·67	1896	1887	1·43	1·37	1905	1896	0·55	0·60	1914
1879	0·71	0·80	1897	1888	1·32	1·24	1906	1897	0·64	0·72	1915
1880	0·86	0·96	1898	1889	1·18	1·08	1907	1898	0·77	0·86	1916
1881	1·02	1·12	1899	1890	1·02	0·92	1908	1899	0·92	1·02	1917
1882	1·19	1·27	1900	1891	0·85	0·77	1909	1900	1·09	1·18	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time — Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. + ″
K. 1312. L. . .	8	0 0 22·64	3·065	·025	52 4 15·0	20·06	·01
1 Rad. 6316. G. .	7·3	1 10·20	3·069	·027	50 37 0·6	20·05	·01
1 Ra. 6317. G. .	6·8	1 11·24	3·069	·027	50 32 49·4	20·05	·01
K. 1343. L. . .	8	1 14·80	3·070	·026	51 39 32·8	20·06	·01
K. 1351. L. . .	8	1 24·05	3·070	·025	51 58 25·8	20·06	·01
Ko. 1378. L.—·3 .	7·8	0 2 24·13	3·075	·027	50 12 4·0	20·06	·01
1 H. 1 . .	8	2 26·07	3·076	·027	50 3 59·5	20·06	·01
Ko. 82. L. . .	8	5 1.38	3·088	·027	50 17 46·5	20·05	·02
Wa. 52. K.+·5 .	8	5 35·95	3·089	·026	51 39 19·2	20·05	·02
K. La. 104. . .	8	5 41·88	3·091	·027	50 47 35·5	20·05	·02
K. 125. W.—·3 .	8	0 6 8·11	3·092	·027	51 24 31·4	20·04	·02
L. 89. . . .	6·5	6 19·24	3·091	·025	53 0 2·6	20·04	·02
K. 201. W. . .	8	8 32·28	3·100	·026	52 37 21·0	20·04	·03
L. 202. W. . .	8	9 24·99	3·107	·026	51 56 9·4	20·03	·03
W. 108. L.—·6 .	7·5	10 21·56	3·113	·028	50 53 39·7	20·04	·03
2 Gre. 17. 1 R. And. θ	5·4	0 10 32·03	3·104	·024	52 0 45·6	20·01	·02

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		h. m. s.		+ s.	+ s.	° ′ ″	− ″	+ ″
K. 323. . .	8	0 13 19·17		3·121	·028	51 9 2·4	20·02	·04
1 Ham. 45. W. −·4*	6·8	13 26·40		3·124	·027	52 27 18·0	20·01	·04
4 Gre. 23. A. And. ρ	6	14 30·09		3·132	·026	52 43 26·8	19·96	·03
1 Ha. 58. L. .	7·5	14 57·56		3·131	·027	52 30 21·9	20·01	·04
Ko. 378. W. .	8	15 39·11		3·132	·026	52 55 52·9	20·01	·04
L. 421. W. . .	7·5	0 16 19·09		3·139	·027	51 56 15·1	20·00	·04
6 Bonn. 58. K. +1·3	Var. 7	17 23·27		3·143	·028	52 6 53·4	19·99	·05
La. 503. . .	7·5	18 43·56		3·152	·028	50 51 40·1	19·99	·04
K. 489. L. . .	8	20 26·67		3·156	·028	51 54 52·8	19·98	·05
K. 561. W. −·4 .	7·8	23 9·50		3·168	·028	52 21 49·9	19·95	·06
K. 601. W. . .	8	0 24 40·51		3·176	·028	51 42 39·7	19·93	·06
Wa. 273. K. +·5 .	7	25 57·91		3·183	·029	51 50 44·1	19·92	·06
Ko. 656. L. +·3 .	7·8	26 43·28		3·191	·030	50 35 6·2	19·92	·06
Ko. 660. L. +·3 .	8	26 50·11		3·191	·030	50 48 20·7	19·91	·06
Dor. 36. . .	8	28 17·84		3·194	·028	51 31 16·3	19·89	·07
L. 884. W. +·3 .	7	0 29 18·47		3·195	·028	52 26 13·1	19·90	·06
K. 761. L. −·5 .	7	30 37·06		3·211	·030	50 21 20·4	19·88	·07
4 Gr. 68. L. . .	8·3	33 15·53		3·220	·030	51 14 46·4	19·84	·08
L. 1033. . .	8	33 41·04		3·222	·030	51 9 26·2	19·84	·07
Ko. 857. L. −1·1 .	8	33 51·74		3·227	·031	50 28 2·1	19·83	·08
4 Gr. 71. 2 R. .	5	0 34 15·25		3·223	·030	51 13 39·8	19·83	·08
L. 1063. . .	8	34 19·89		3·225	·030	51 4 56·3	19·82	·08
K. 890. . .	7·8	34 59·23		3·224	·030	51 47 27·3	19·82	·08
K. 892. . .	8	35 3·26		3·225	·030	51 38 14·4	19·82	·08
1 Ra. 198. G. .	7	37 41·35		3·247	·032	50 0 15·8	19·79	·07
2 Ha. 296 . .	7·8	0 40 23·43		3·250	·031	51 39 10·1	19·74	·09
L. 1323. . .	8	42 35·03		3·253	·029	52 28 36·9	19·71	·09
K. 1083. L. −·4 .	8	43 3·55		3·259	·030	51 56 34·6	19·70	·10
6 Bon. 151. . .	7	44 13·80		3·260	·030	52 38 12·1	19·68	·10
1 Rad. 234. G K. +·4	7	45 51·35		3.283	·032	50 26 11·0	19·65	·10
2 H. 360. W. .	6·7	0 45 53·05		3·271	·031	52 7 49·5	19·65	·11
2 H. 361. W. .	7·8	45 58·13		3·275	·031	51 38 34·5	19·64	·11
K. 1161. L. . .	8	46 3·10		3·276	·031	51 31 15·4	19·65	·10
K. 1193. W. −·3 .	8	47 15·31		3·281	·031	51 36 40·6	19·63	·11
D. 70.* . .	8	47 35·18		3·283	·031	51 30 26·1	19·62	·11
1 Ra. 252. G. .	8·1	0 48 22·91		3·296	·033	50 17 41·7	19·60	·10
4 Gree 108 2 R And μ	4	49 40·97		3·292	·030	52 10 45·0	19·63	·11
K. 1285. W. .	7	51 5·35		3·301	·032	51 11 58·9	19·56	·11
K. 1312. L. −·4 .	8	51 59·78		3·307	·032	51 3 30·5	19·53	·12
1 Ra. 284. G. .	7·7	52 19·45		3·313	·033	50 31 9·6	19·53	·11
K. 1323. L. . .	8	0 52 29·30		3·309	·032	51 0 1·5	19·52	·12
K. 1341. L. . .	7·8	53 26·50		3·297	·030	52 53 1·8	19·51	·12
K. 1380. L. +·6 .	8	55 24·85		3·320	·032	51 11 41·2	19·47	·12
6 B. 199. K. +·4 .	7	56 56·72		3·321	·032	51 58 56·9	19·43	·13
1 Gre. 69. 1 R. .	6	57 25·19		3·336	·031	50 40 43·4	19·43	·12
K. 1437. L. . .	8	0 58 0·91		3.323	·031	52 11 41·5	19·41	·12
6 B. 187. . .	8	58 39·67		3·335	·033	51 17 42·4	19·40	·14
K. 1484. L. −·6 .	8	59 58·79		3·334	·032	52 1 7·0	19·37	·13

1 Ham. 45. perhaps a P.M. of −010 to −015 should have been adopted and reckoned from 1836.
D. 70. Duplex **8** − 24″ − **9** − 182° the northern.

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		1h.R.A.	2h.R.A.			1h.R.A.	2h.R.A.			1h.R.A.	2h.R.A.
		sec.	sec.			sec.	sec.			sec.	sec.
Jan.	1...	10·18	10·62	May	1...	9·64	9·57	Sept.	8...	13·68	13·60
	11...	9·98	10·44		11...	9·88	9·74		18...	13·88	13·88
	21...	9·78	10·25		21...	10·15	9·96		28...	14·04	14·12
	31...	9·60	10·05		31...	10·46	10·22	Oct.	8...	14·16	14·32
Feb.	10...	9·44	9·86	June	10...	10·79	10·51		18...	14·24	14·48
	20...	9 31	9·69		20...	11·13	10·83		28...	14·27	14·59
Mar.	2...	9·21	9·54		30...	11·49	11·17	Nov.	7...	14·26	14·66
	12...	9·16	9·43	July	10...	11·84	11·53		17...	14·20	14·68
	22...	9·16	9·36		20...	12·19	11·90		27...	14·10	14·65
April	1...	9·20	9·33		30...	12·54	12·26	Dec.	7...	13·97	14·58
	11...	9·30	9·36	Aug.	9...	12·86	12·62		17...	13·81	14·46
	21...	9·45	9·44		19...	13·16	12·97		27...	13·63	14·31
May	1...	9·64	9·57		29...	13·44	13·30		37...	13·43	14·15
				Sept.	8...	13·68	13·60				

TABLE III.

Jan. 1	R. A. 1 h. sec.	R. A. 2 h. sec.	Aug. 12	Jan. 1	R. A. 1 h. sec.	R. A. 2 h. sec.	Aug. 12	Jan. 1	R. A. 1 h. sec.	R. A. 2 h. sec.	Aug. 12
1873	0·69	0·63	1891	1882	1·27	1·33	1900	1891	0·77	0·70	1909
1874	0·58	0·56	1892	1883	1·39	1·42	1901	1892	0·64	0·60	1910
1875	0·53	0·54	1893	1884	1·47	1·47	1902	1893	0·56	0·55	1911
1876	0·52	0·57	1894	1885	1·49	1·45	1903	1894	0·52	0·55	1912
1877	0·57	0·64	1895	1886	1·46	1·39	1904	1895	0·54	0·59	1913
1878	0·67	0·76	1896	1887	1·37	1·28	1905	1896	0·60	0·68	1914
1879	0·80	0·90	1897	1888	1·24	1·14	1906	1897	0·72	0·81	1915
1880	0·96	1·05	1898	1889	1·08	0·98	1907	1898	0·86	0·96	1916
1881	1·12	1·20	1899	1890	0·92	0·83	1908	1899	1·02	1·11	1917
1882	1·27	1·33	1900	1891	0·77	0·70	1909	1900	1·18	1·26	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. + ″
K. 1490. W. .	7	1 0 13·26	3·329	·031	52 38 24·4	19·37	·13
1 Gre. 71. . .	7·9	0 47·90	3·344	·030	51 24 55·4	19·35	·12
K. 1525. L.—·3 .	8	1 35·32	3·338	·031	52 14 1·6	19·33	.14
Ko. 1539. W. .	8	2 33·49	3·339	·031	52 32 33·4	19·31	·14
4 Gr. 152. Ar. .	6	3 58·77	3·340	·031	52 56 30·1	19·27	·14
K. 119. L.—·3 .	8	1 8 9·48	3·367	·032	52 10 33·7	19·18	·15
Do. 99. . .	8	9 40·15	3·374	·032	52 11 56·3	19·13	·16
K. 162. W. . .	7	9 58·32	3·386	·033	51 10 47·9	19·12	·16
Ko. 189. L.—·5 .	8	11 1·83	3·383	·032	51 52 31·5	19·09	·16
Rad. 398. GL. .	7·2	11 32·67	3·399	·034	50 41 38·3	19·09	·14
K. 236. L.—·7 .	8	1 12 49·53	3·395	·033	51 33 51·3	19·04	·16
Ko. 247. L.—1·0 .	8	13 41·16	3·386	·032	52 37 25·5	19·02	·17
1 Ra. 420. G. .	8·2	15 47·88	3·427	·035	50 2 38·4	18·96	·16
4 Gre. 188. 2 R. .	6	16 19·29	3·399	·032	52 56 18·0	18·92	·17
Ko. 315. L. . .	7·8	16 34·09	3·422	·034	50 43 45·7	18·94	·17
6 B. 240. . .	7·8	1 16 51·89	3·394	·032	53 7 31·7	18·93	·18

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		h. m. s.	+ s.	+ s.	° ′ ″	− ″	+ ″
Ko. 325. W. .	8	1 17 2·16	3·414	·033	51 35 27·6	18·93	·17
Ko. 329. . .	7	17 7·85	3·413	·033	51 37 41·3	18·93	·17
Wa. 684. K.+·5 .	8	19 48·58	3·434	·034	50 59 35·0	18·84	·18
1 Ra. 434. G. .	6·9	20 19·13	3·444	·035	50 18 46·5	18·83	·17
Ko. 419. . .	8	20 29·65	3·434	·034	51 17 6·6	18·82	·18
L. 2728. . .	8	1 23 33·68	3·448	·034	51 9 7·0	18·73	·18
2 H. 699. . .	8	23 58·37	3·440	·034	51 52 41·9	18·71	·19
K. 517. L.−1·3 .	8	24 49·02	3·436	·033	52 22 22·7	18·69	·19
Ko. 527. L. . .	7·8	25 23·41	3·437	·033	52 31 17·4	18·67	·19
Ko. 566. L. . .	7·9	26 53·82	3·453	·034	51 47 50·4	18·61	·20
Ko. 604. L. . .	7·5	1 28 23·51	3·475	·035	50 45 30·1	18·57	·20
L. 2895. . .	8	28 41·38	3·444	·032	53 1 57·0	18·57	·19
Ko. 629. L. . .	7·8	29 20·08	3·458	·033	52 11 9·0	18·54	·20
Ko. 650. L. . .	7·8	30 20·30	3·456	·033	52 36 40·2	18·51	·20
L. 2980. . .	8	31 14·41	3·468	·033	51 59 4·5	18·48	·20
Do. 133. W.−·5*.	8	1 32 30·02	3·479	·034	51 39 51·5	18·43	·21
K. 714. . .	7	32 41·70	3·488	·035	51 2 49·3	18·43	·21
4Gre.227.2R. And r	5	32 57·19	3·509	·036	50 3 24·9	18·36	·21
K. 734. L.−·8 .	8	33 17·20	3·475	·034	52 3 57·3	18·41	·21
K. 738. W. . .	8	33 27·23	3·474	·033	52 22 7·8	18·41	·21
1 Rad. 508. G. .	7·1	1 34 58·95	3·510	·036	50 15 16·3	18·35	·20
Ko. 789. L.−·6 .	7	35 6·36	3·482	·034	52 6 58·3	18·35	·21
L. 3152. . .	8	36 33·74	3·491	·034	52 6 42·1	18·29	·21
Ko. 824. L. . .	7·8	36 48·88	3·477	·033	52 57 40·9	18·28	·22
Ko. 826. Do. .	7·8	36 51·34	3·513	·036	50 40 13·9	18·28	·22
K. 857. L. . .	8	1 38 23·43	3·514	·035	51 0 55·8	18·22	·22
K. 876. W. . .	8	39 12·69	3·503	·034	51 52 41·2	18·19	·22
4 Gre. 234. 2 R. .	6	40 59·93	3·504	·033	52 40 13·7	18·13	·22
K. 963. L.−·6 .	8	42 25·68	3·514	·034	52 3 38·5	18·07	·23
R. 13. L.−·4 .	7	42 49·77	3·511	·034	52 18 48·9	18·07	·23
K. 982. . .	8	1 43 22·75	3·502	·033	53 4 4·3	18·04	·23
L. 3345. . .	6·9	43 29·43	3·509	·033	52 35 48·7	18·03	·23
K. 988. . .	8	43 36·71	3·523	·034	51 47 7·4	18·03	·23
Ko. 1014. L.−·5 .	7·8	44 50·11	3·514	·033	52 38 15·4	17·99	·23
6 B. 424. . .	8	45 31·03	3·554	·036	50 26 45·9	17·95	·24
6 B. 427. . .	7·8	1 45 52·85	3·551	·036	50 44 7·9	17·94	·24
6 B. 432. . .	8	46 52·54	3·562	·036	50 19 48·1	17·90	·25
K. 1063. . .	7	46 56·68	3·556	·036	50 40 4·4	17·90	·24
K. 1091. L.−·6 .	8	48 12·41	3·526	·033	52 44 49·3	17·85	·24
K. 1141. . .	8	49 59·12	3·530	·033	52 56 24·0	17·78	·25
L. 3579. . .	8	1 50 4·17	3·544	·034	52 9 53·4	17·77	·24
K. 1176. L.−·8 .	8	51 7·96	3·534	·033	52 55 28·0	17·73	·25
2 R. 239. L. .	7·4	52 30·92	3·556	·034	52 1 8·2	17·67	·25
K. 1220. . .	8	52 31·18	3·539	·033	52 58 25·4	17·68	·25
6 B. 450. . .	7·9	52 40·17	3·581	·036	50 38 25·5	17·66	·26
K. 1236. . .	7·8	1 52 58·82	3·576	·036	50 58 46·1	17·66	·25
K. 1238. L.+·4 .	7·9	53 9·19	3·561	·034	51 55 22·5	17·65	·25
K. 1332. L. . .	8	56 54·19	3·589	·035	51 10 1·0	17·49	·26
K. 1359. L. . .	8	57 54·16	3·599	·036	51 50 26·1	17·44	·27
L. 3836. . .	8	58 34·02	3·586	·035	51 41 59·6	17·42	·26

D. 133. Duplex oblong.

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		2h.R.A.	3h.R.A.			2h.R.A.	3h.R.A.			2h.R.A.	3h.R.A.
		sec.	sec.			sec.	sec.			sec.	sec.
Jan.	1...	10·62	11·03	May	1...	9·57	9·59	Sept.	8...	13·60	13·43
	11...	10·44	10·88		11...	9·74	9·69		18...	13·88	13·76
	21...	10·25	10·70		21...	9·96	9·85		28...	14·12	14·07
	31...	10·05	10·51		31...	10·22	10·04	Oct.	8...	14·32	14·34
Feb.	10...	9·86	10·31	June	10...	10·51	10·29		18...	14·48	14·58
	20...	9·69	10·12		20...	10·83	10·57		28...	14·59	14·77
Mar.	2...	9·54	9·94		30...	11·17	10·88	Nov.	7...	14·66	14·92
	12...	9·43	9·78	July	10...	11·53	11·22		17...	14·68	15·02
	22...	9·36	9·65		20...	11·90	11·58		27...	14·65	15·07
April	1...	9·33	9·57		30...	12·26	11·95	Dec.	7...	14·58	15·06
	11...	9·36	9·53	Aug.	9...	12·62	12·33		17...	14·46	15·01
	21...	9·44	9·53		19...	12·97	12·70		27...	14·31	14·92
May	1...	9·57	9·59		29...	13·30	13·07		37...	14·15	14·79
				Sept.	8...	13·60	13·43				

TABLE III.

Jan. 1	R. A. 2 h.	R. A. 3 h.	Aug. 12	Jan. 1	R. A. 2 h.	R. A. 3 h.	Aug. 12	Jan. 1	R. A. 2 h.	R. A. 3 h.	Aug. 12
	sec.	sec.			sec.	sec.			sec.	sec.	
1873	0·63	0·61	1891	1882	1·33	1·37	1900	1891	0·70	0·65	1909
1874	0·56	0·57	1892	1883	1·42	1·43	1901	1892	0·60	0·59	1910
1875	0·54	0·58	1893	1884	1·47	1·43	1902	1893	0·55	0·57	1911
1876	0·57	0·64	1894	1885	1·45	1·39	1903	1894	0·55	0·60	1912
1877	0·64	0·74	1895	1886	1·39	1·30	1904	1895	0·59	0·67	1913
1878	0·76	0·86	1896	1887	1·28	1·17	1905	1896	0·68	0·78	1914
1879	0·90	1·01	1897	1888	1·14	1·03	1906	1897	0·81	0·92	1915
1880	1·05	1·15	1898	1889	0·98	0·88	1907	1898	0·96	1·06	1916
1881	1·20	1·28	1899	1890	0·83	0·75	1908	1899	1·11	1·20	1917
1882	1·33	1·37	1900	1891	0·70	0·65	1909	1900	1·26	1·32	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. + ″
4 Gre. 278. 2 R. .	5	2 0 37·15	3·585	·036	52 44 6·0	17·27	·27
K. 1427. . .	8	0 31·39	3·603	·036	51 11 55·6	17·33	·27
K. 1441. . .	7·3	0 58·61	3·603	·036	51 14 51·1	17·31	·27
4 Gre. 282. 1 R. .	7	2 58·00	3·603	·035	51 33 5·9	17·19	·28
4 Gre. 283. 1 R. .	7·5	2 58·85	3·604	·035	51 32 52·2	17·20	·28
K. 57. . . .	8	2 4 41·74	3·637	·037	50 19 58·0	17·14	·28
L. 4040. . .	8	5 11·58	3·645	·037	50 4 26·2	17·12	·28
K. 101. L.−·6 .	8	6 2·34	3·589	·033	52 58 1·5	17·08	·28
K. 105. L. . .	8	6 13·09	3·610	·035	51 56 53·8	17·07	·28
K. 147. W.−·4 .	7·8	7 21·66	3·625	·035	51 24 53·5	17·02	·29
K. 205. L. . .	7·8	2 9 48·71	3·664	·037	50 1 48·6	16·91	·29
K. 228. . .	8	10 21·58	3·636	·035	51 29 37·2	16·88	·29
Dor. 218.* . .	7	10 33·34	3·663	·037	50 17 58·5	16·87	·30
1 Ra. 682. GKR. .	6·8	11 34·30	3·656	·036	50 44 31·1	16·81	·30
K. 248. . .	8	11 35·13	3·645	·036	51 6 7·7	16·82	·30
6 B. 533. . .	7·5	2 12 40·26	3·631	·034	52 12 21·6	16·77	·30

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		h. m. s.		+ s.	+ s.	° ′ ″	− ″	+ ″
Do. 224. . .	8	2 13 40·99		3·656	·035	51 11 42·1	16·72	·30
K. 299. L.−·4 .	7·3	13 45·63		3·638	·034	52 3 57·4	16·71	·30
L. 4342. W.−·3 .	8	14 24·68		3·624	·033	52 52 17·6	16·68	·30
L. 4367. . .	7·5	15 16·54		3·639	·034	52 18 59·2	16·64	·30
K. 337. L. . .	8	15 19·80		3·625	·033	53 0 38·2	16·64	·30
K. 355. 6 B. ‡+·5	8	2 16 0·92		3·679	·036	50 28 44·1	16·61	·31
L. 4387. W.−·4 .	8	16 6·67		3·663	·034	52 13 20·5	16·60	·30
K. 360. L. . .	7	16 11·16		3·675	·036	50 44 26·7	16·60	·31
L. 4484. . .	8	18 21·20		3·650	·034	52 19 52·6	16·49	·31
K. 417. . .	8	18 47·77		3·695	·036	50 19 6·5	16·46	·32
K. 420. . .	7·9	2 18 49·80		3·636	·033	53 0 51·1	16·47	·31
K. 452. L. . .	7	20 3·61		3·667	·035	51 43 19·9	16·40	·32
K. 486. L. . .	7·2	21 12·82		3·660	·034	52 20 9·0	16·34	·32
1 Gr. 213. 1 R. .	6	21 48·44		3·683	·033	51 25 16·8	16·32	·31
1 Rad. 725. Ro. .	7·6	22 5·41		3·678	·035	51 36 14·5	16·31	·30
L. 4586. . .	7·5	2 22 28·67		3·708	·036	50 23 14·8	16·28	·32
K. 533. L.−·5 .	7·5	23 24·09		3·651	·033	53 6 8·3	16·23	·32
K. 541. L.−·3 .	7·7	23 34·70		3·708	·036	50 35 33·4	16·22	·33
K. 545. W. . .	7	23 44·14		3·666	·034	52 25 59·9	16·21	·32
K. 559. L.−·3 .	6·8	24 9·87		3·716	·036	50 16 52·4	16·20	·33
K. 560. L. . .	7·3	2 24 11·33		3·713	·036	50 28 11·5	16·20	·33
6 B. 502. W. .	7·8	24 33·97		3·702	·036	51 0 15·4	16·17	·33
6 B. 506. K. .	7	25 59·18		3·689	·035	51 48 59·1	16·10	·33
K. 600. 6 B. ‡ .	8	26 5·51		3·725	·036	50 15 28·6	16·09	·33
K. 644. L.+·3 .	8	27 36·82		3·713	·035	51 0 2·4	16·02	·33
L. 4764. . .	8	2 28 4·04		3·731	·036	50 20 29·5	15·99	·33
2 Ha. 1334. W.+·4	6	28 44·33		3·699	·034	51 48 19·2	15·96	·34
K. 679. L.−·3 .	6	29 6·19		3·726	·036	50 38 54·7	15·93	·34
K. 694. L. . .	7·8	29 42·76		3·705	·035	51 38 7·7	15·90	·34
Ko. 701. L. . .	6·5	30 9·63		3·680	·033	52 48 56·3	15·87	·34
K. 704. . .	6·5	2 30 18·05		3·687	·034	52 27 17·5	15·87	·34
L. 4845. . .	8	30 38·70		3·716	·035	51 23 29·5	15·85	·34
Ro. 17. L. . .	8	32 21·71		3·745	·036	50 25 22·0	15·76	·35
4 Gr. 353. 2 R. .	5	33 56·66		3·752	·036	50 20 10·3	15·49	·35
Dor. 261. K.* .	7·5	34 10·47		3·756	·036	50 16 24·1	15·66	·35
6 B. 544. . .	8	2 34 58·13		3·737	·035	51 10 4·6	15·62	·35
K. 874. . .	7·5	37 5·78		3·713	·033	52 27 44·2	15·50	·35
L. 5084. . .	8	38 29·28		3·744	·035	51 24 51·7	15·42	·35
K. 920. L.−·4, .	8	39 1·26		3·765	·036	50 36 34·2	15·39	·36
K. 927. W.+·3 .	8	39 13·03		3·713	·033	52 44 1·9	15·38	·36
K. 967. L. . .	8	2 40 42·41		3·716	·033	52 51 38·8	15·29	·36
K. 968. L.−·5 .	7·8	40 52·78		3·785	·036	50 2 34·0	15·29	·37
4 Gr. 366. 2 R. .	5·4	42 15·27		3·755	·033	52 11 51·0	15·14	·36
K. 1033. L.−·3 .	7·8	43 23·17		3·787	·036	50 22 51·2	15·14	·37
4 Gr. 368. A. .	6	45 22·49		3·753	·033	52 10 23·6	14·95	·37
K. 1091. L. . .	7·8	2 46 18·49		3·736	·033	52 46 15·2	14·98	·37
K. 1095. . .	8	46 32·08		3·780	·035	51 4 56·6	14·97	·37
K. 1144. . .	8	48 20·64		3·768	·034	51 48 19·3	14·86	·38
K. 1152. L. . .	8	48 40·90		3·778	·034	51 26 32·9	14·84	·38
K. 1165. L.−·3 .	8	49 30·63		3·780	·034	51 27 13·6	14·79	·38
1 Rad. 840. 6 B. .	6	2 49 39·36		3·770	·033	51 53 19·5	14·78	·36
1Gre.250. 1R. Per.π	5	50 18·42		3·802	·034	50 50 20·4	14·70	·37
1 Ha. 752. . .	7·6	50 31·74		3·769	·033	52 5 56·1	14·72	·38

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Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. + ″
K. 1223. L. . .	7	2 51 48·83	3·764	·033	52 22 5.2	14·65	·38
K. 1238. . .	7·3	52 25·14	3·827	·035	50 4 50.6	14·61	·39
K. 1241. . .	8	52 25·29	3·797	·034	51 14 11·5	14·61	·39
K. 1253. L.—·5 .	7·7	53 5·15	3·828	·035	50 8 0·7	14·58	·39
1 Rad. 855. G. .	6·9	53 27·27	3·789	·033	51 37 5·5	14·56	·37
6 B. 692. . .	7	2 55 6·43	3·784	·033	52 4 58·5	14·45	·39
K. 1313. . .	7	55 44·84	3·777	·032	52 24 46·6	14·41	·39
K. 1320. L.—·3 .	6·8	55 55·46	3·835	·035	50 11 49·1	14·40	·40
3 Gre. 199. 2 R. Per ρ	Var. 4	56 41·31	3·811	·033	51 38 44·8	14·24	·39
Ko. 1342. . .	8	56 55·95	3·823	·034	50 50 10·9	14·34	·40
Ko. 1359. L. .	8	2 57 37·55	3·772	·032	52 53 48·6	14·30	·39
Ko. 1387. . .	8	58 45·82	3·844	·035	50 16 56·1	14·23	·40
K. 1391. L.—·4 .	8	58 55·63	3·780	·032	52 40 29·5	14·21	·40
Ko. 1394. . .	8	59 4·67	3·842	·035	50 23 56·0	14·20	·40

Dor. 218. Dup. **7**−11″−**8**−292° the 2nd. Dor. 261. **7·5**−23″−**8·2**−211° the 2nd.

3
hours

TABLE II.

		3h.R.A. sec.	4h.R.A. sec.			3h.R.A. sec.	4h.R.A. sec.			3h.R.A. sec.	4h.R.A. sec.
Jan.	1...	11·03	11·36	May	1...	9·59	9·71	Sept.	8...	13·43	13·16
	11...	10·88	11·26		11...	9·69	9·74		18...	13·76	13·54
	21...	10·70	11·12		21...	9·85	9·83		28...	14·07	13·90
	31...	10·51	10·96		31...	10·04	9·96	Oct.	8...	14·34	14·23
Feb.	10...	10·31	10·77	June	10...	10·29	10·14		18...	14·58	14·54
	20...	10·12	10·57		20...	10·57	10·37		28...	14 77	14 80
Mar.	2...	9·94	10·37		30...	10·88	10·64	Nov.	7...	14·92	15·02
	12...	9·78	10·19	July	10...	11·22	10·94		17...	15·02	15·20
	22...	9·65	10·02		20...	11·58	11·27		27...	15·07	15·33
April	1...	9·57	9 88		30...	11·95	11·63	Dec.	7...	15·06	15·40
	11...	9·53	9·78	Aug.	9...	12·33	12·00		17...	15·01	15·42
	21...	9·53	9·72		19...	12·70	12·39		27...	14·92	15 40
May	1...	9·59	9·71		29...	13·07	12·78		37...	14·79	15·32
				Sept.	8...	13·43	13·16				

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Jan. 1	R. A. 3 h. sec.	R. A. 4 h. sec.	Aug. 12	Jan. 1	R. A. 3 h. sec.	R. A. 4 h. sec.	Aug. 12	Jan. 1	R. A. 3 h. sec.	R. A. 4 h. sec.	Aug. 12
1873	0·61	0·61	1891	1882	1·37	1·39	1900	1891	0·65	0·63	1909
1874	0·57	0·61	1892	1883	1·43	1·40	1901	1892	0·59	0·60	1910
1875	0·58	0·66	1893	1884	1·43	1·37	1902	1893	0·57	0·62	1911
1876	0·64	0·74	1894	1885	1·39	1·30	1903	1894	0·60	0·68	1912
1877	0·74	0·85	1895	1886	1·30	1·19	1904	1895	0·67	0·78	1913
1878	0·86	0·98	1896	1887	1·17	1·06	1905	1896	0·78	0·90	1914
1879	1·01	1·11	1897	1888	1·03	0·92	1906	1897	0·92	1·03	1915
1880	1·15	1·23	1898	1889	0·88	0·79	1907	1898	1·06	1·16	1916
1881	1·28	1·33	1899	1890	0·75	0·69	1908	1899	1·20	1·27	1917
1882	1·37	1·39	1900	1891	0·65	0·63	1909	1900	1·32	1·36	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. + ″
K. 1457. L.—·4 .	8	3 1 37·03	3·802	·032	52 8 3·7	14·05	·40
4 Gre. 399. 1 R Per. ω	5	2 43·53	3·840	·034	50 51 53·4	13·99	·41
L. 5834. . .	8	2 54·54	3·801	·032	52 24 18·7	13·97	·40
K. 12. W.—·4 .	7·5	2 55·08	3·801	·032	52 24 29·5	13·97	·40
6 Bo. 722. K. .	6·9	3 16·65	3·789	·031	52 53 29·1	13·94	·41
Ko. 58. L.—·4 .	8	3 4 34·23	3·830	·033	51 30 2·1	13·87	·41
K. 69. W.—·4 .	8	4 51·51	3·831	·033	51 30 19·5	13·85	·41
Ko. 85. L. . .	7·5	5 30·65	3·865	·034	50 21 0·4	13·80	·42
Ko. 91. . .	8	5 32·54	3·798	·031	52 47 48·1	13·80	·41
Ko. 126. L.—·3 .	7·5	7 8·69	3·826	·032	51 57 2·9	13·70	·41
Ko. 149. L.—·7 .	7·8	3 7 58·77	3·832	·032	51 49 42·9	13·64	·42
K. 174. L.—·7 .	8	9 8·29	3·835	·032	51 49 18·7	13·57	·42
4 Gre. 408. 1 R. .	6	9 8·88	3·854	·033	51 10 39·8	13·57	·42
Ko. 189. . .	7·9	9 56·46	3·808	·031	52 54 8·2	13·52	·42
6 B. 751. c. L.—·9	7	9 56·38	3·833	·032	51 59 54·6	13·52	·42
6 B. 753. . .	7·4	3 9 57·74	3·819	·031	51 31 24·3	13·52	·42
L. 6075. . .	8	10 42·16	3·853	·033	51 23 57·1	13·47	·42
K. 236. L.—·5 .	7·8	12 16·31	3·852	·032	51 34 11·5	13·37	·43
K. 282. L.—·5 .	7·7	14 20·49	3·824	·031	52 47 17·3	13·23	·42
L. 6217. . .	8	15 43·38	3·897	·033	50 24 6·0	13·14	·43
K. 318. L. . .	7·8	3 16 13·93	3·907	·034	50 13 23·4	13·11	·44
K. 331. L.—1·1 .	7·8	16 41·87	3·839	·031	52 31 34·8	13·08	·43
K. 348. L. . .	8	17 14·80	3·851	·031	52 11 56·4	13·04	·43
Ko. 362. W. .	7·6	18 48·62	3·849	·031	52 23 35·6	12·93	·44
K. 392. L. . .	6·8	19 44·30	3·914	·033	50 5 53·3	12·87	·44
Ko. 399. . .	8	3 19 59·75	3·868	·031	51 49 25·2	12·85	·44
K. 402. L.—·3 .	7·3	20 10·76	3·915	·033	50 14 59·4	12·84	·44
K. 420. W. . .	8	21 19·41	3·838	·030	53 1 5·9	12·76	·44
K. 436. . .	8	22 17·27	3·905	·032	50 47 6·9	12·70	·45
6 B. 737. . .	7	22 25·40	3·891	·031	51 16 54·0	12·69	·45
K. 470. . .	6·8	3 23 41·06	3·862	·030	52 21 53·0	12·60	·44
1 Rad. 1004. G. .	6·4	24 47·30	3·921	·032	50 31 23·7	12·52	·45
K. 500. L. . .	7	24 58·43	3·865	·030	52 24 41·0	12·52	·45
K. 502. L. . .	7·5	25 3·92	3·859	·030	52 37 45·3	12·51	·45
6 B. 743. . .	7·9	25 16·75	3·905	·031	51 6 59·4	12·49	·46

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Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. + ″
K. 516. L. . .	8	3 25 46·55	3·936	·032	50 7 0·4	12·46	·46
2 Ha. 1775. L.−·7	7·8	25 59·98	3·892	·030	51 36 52·3	12·45	·46
K. 528. W. . .	7	26 22·41	3·885	·030	51 50 8·7	12·42	·45
L. 6540. . .	8	26 30·59	3·870	·030	52 24 17·4	12·41	·45
K. 585. L. . .	7	28 32·93	3·938	·032	50 19 33·5	12·27	·46
K. 606. L. . .	7	3 29 15·34	3·861	·029	52 59 0·9	12·22	·45
K. 669. W. & D.*.	7	32 1·33	3·918	·030	51 17 25·9	12·03	·46
4 Gr. 451. 2 R. .	6	32 24·88	3·872	·028	52 49 30·8	12·00	·46
L. 6729. A. . .	7·5	33 0·37	3·876	·029	52 48 54·1	11·95	·46
L. 6734. . .	8	33 12·91	3·914	·030	51 34 24·5	11·94	·46
K. 747. . .	8	3 35 7·29	3·893	·029	52 25 19·8	11·81	·47
Dor. 368. K.* .	7	35 10·90	3·905	·029	52 1 32·0	11·80	·47
K. 750. L.−·3 .	7·5	35 12·02	3·905	·029	52 1 34·0	11·81	·47
K. 751. W. . .	8	35 14·24	3·905	·029	52 1 34·5	11·80	·47
K. 781. L. . .	7	36 9·96	3·960	·031	50 19 4·0	11·74	·47
1 Rad. 1054. G. .	7	3 36 48·52	3·918	·029	51 43 11·0	11·68	·48
K. 856. D. . .	7·8	39 13·02	3·915	·029	52 2 51·6	11·52	·47
6 Bo. 833. W. .	6·2	41 14·46	3·906	·028	52 30 29·7	11·37	·48
L. 7080. . .	7·5	43 34·17	3·992	·030	50 0 41·8	11·20	·48
6 Bo. 819. W.−·3	8	45 11·80	3·938	·028	51 49 31·7	11·08	·49
K. 991. . .	7·8	3 45 57·58	3·982	·029	50 30 44·0	11·03	·49
K. 999. L. . .	8	46 36·65	3·933	·028	52 3 19·4	10·98	·49
1 Gre. 336. 1 R Per ε*	3·4	48 50·41	3·991	·027	50 21 13·0	10·78	·49
1 Rad. 1108. G. K.	6·5	49 32·76	3·959	·028	51 31 13·2	10·77	·48
1 Rad. 1114. G. .	6·6	50 43·68	3·959	·027	51 32 20·2	10·66	·50
6 B. 904. K. .	7·4	3 51 9·07	4·000	·028	50 20 42·5	10·64	·50
6 Bo. 905. K. .	8	51 27·31	4·008	·028	50 9 18·7	10·62	·51
K. 1112. L.−·3 .	7·3	52 9·42	3·950	·027	51 58 40·5	10·56	·50
K. 1113. M. .	7	52 13·57	4·007	·029	50 15 32·6	10·56	·50
Dor. 395. K.* .	7·3	52 38·31	3·960	·027	51 41 19·7	10·53	·50
L. 7369. . .	7·3	3 52 44·37	4·004	·029	50 21 55·2	10·52	·50
6 B. 834. W. .	7·3	53 30·43	3·976	·027	51 15 12·8	10·47	·50
K. 1153. . .	7	54 16·29	3·944	·026	52 17 48·0	10·41	·50
K. 1163. . .	7·6	54 53·47	3·943	·026	52 22 41·1	10·36	·50
2 H. 2063. . .	8	55 3·17	3·994	·028	50 50 6·5	10·35	·51
6 B. 870. . .	8	3 55 12·55	3·933	·026	52 44 17·2	10·34	·50
K. 1171. L.+·4 .	7·4	55 25·14	3·972	·027	51 32 55·2	10·32	·50
K. 1175. L. . .	8	55 44·74	3·976	·027	51 26 45·8	10·30	·50
K. 1189. . .	7·5	56 23·53	4·023	·028	50 2 34·1	10·25	·51
L. 7488. . .	7·3	56 44·36	3·941	·026	52 35 9·9	10·22	·50
K. 1228. L.−·3 .	7·7	3 58 19·67	3·930	·025	53 3 6·0	10·10	·50
2 H. 2092. . .	8	58 26·14	3·953	·025	52 18 54·4	10·09	·51
2 Ra. 457. M. .	7·6	58 35·24	3·956	·026	52 15 20·4	10·08	·50
4 Gr. 515. 2 R. .	6·7	59 20·65	3·938	·025	52 36 9·3	9·86	·50
4 Gre. 516. 2 R. .	6	59 36·63	3·971	·025	52 17 22·5	9·80	·50

K. 669. Dup. **7**−20″−**8·5**−341° the 2nd.
1 Gre. 336. Dup. **3·1**−9″−**8·3**−9°.
Dor. 368. Dup. **7**−28″−**7·8**−88° the 1st.
Dor. 395. **7·5**−18″−**8·7**−284° the 2nd.

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		4h.R.A.	5h.R.A.			4h.R.A.	5h.R.A.			4h.R.A.	5h.R.A.
		sec.	sec.			sec.	sec.			sec.	sec.
Jan.	1...	11·36	11·60	May	1...	9·71	9·91	Sept.	8...	13·16	12·83
	11...	11·26	11·57		11...	9·74	9·88		18...	13·54	13·23
	21...	11·12	11·48		21...	9·83	9·90		28...	13·90	13·62
	31...	10·96	11·36		31...	9·96	9·97	Oct.	8...	14·23	13·99
Feb.	10...	10·77	11·20	June	10...	10·14	10·08		18...	14·54	14·35
	20...	10·57	11·01		20...	10·37	10·24		28...	14·80	14·67
Mar.	2...	10·37	10·82		30...	10·64	10·45	Nov.	7...	15·02	14·97
	12...	10·19	10·63	July	10...	10·94	10·70		17...	15·20	15·22
	22...	10·02	10·43		20...	11·27	10·99		27...	15·33	15·42
April	1...	9·88	10 25		30...	11·63	11·32	Dec.	7...	15·40	15·57
	11...	9·78	10·10	Aug.	9...	12·00	11·67		17...	15·42	15·67
	21...	9·72	9·99		19...	12·39	12·04		27...	15·40	15·71
May	1...	9·71	9·91		29...	12·78	12·43		37...	15·32	15·70
				Sept.	8...	13·16	12·83				

TABLE III.

	R. A.	R. A.			R. A.	R. A.			R. A.	R. A.	
Jan. 1	4 h.	5 h.	Aug. 12	Jan. 1	4 h.	5 h.	Aug. 12	Jan. 1	4 h.	5 h.	Aug. 12
	sec.	sec.			sec.	sec.			sec.	sec.	
1873	0·61	0·63	1891	1882	1·39	1·38	1900	1891	0·63	0·63	1909
1874	0·61	0·67	1892	1883	1·40	1·35	1901	1892	0·60	0·64	1910
1875	0·66	0·75	1893	1884	1·37	1·29	1902	1893	0·62	0·70	1911
1876	0·74	0·85	1894	1885	1·30	1·18	1903	1894	0·68	0·79	1912
1877	0·85	0·97	1895	1886	1·19	1·06	1904	1895	0·78	0·90	1913
1878	0·98	1·10	1896	1887	1·06	0·93	1905	1896	0·90	1·02	1914
1879	1·11	1·21	1897	1888	0·92	0·81	1906	1897	1·03	1·14	1915
1880	1·23	1·30	1898	1889	0·79	0·72	1907	1898	1·16	1·25	1916
1881	1·33	1·36	1899	1890	0·69	0·65	1908	1899	1·27	1·33	1917
1882	1·39	1·38	1900	1891	0·63	0·63	1909	1900	1·36	1·37	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time — Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. + ″
K. 1273. L. . .	7·8	4 0 4·29	4·028	·027	50 10 2·3	9·99	·51
K. 1302. - .	7·8	1 18·26	3·999	·026	51 6 22·9	9·89	·51
L. 7673. . .	7·5	1 37·30	3·977	·026	51 50 32·8	9·85	·51
2 H. 2146. K. + ·6	8	3 23·52	3·954	·024	52 37 4·4	9·71	·51
Ko. 43. L. − ·6 .	7	4 37·52	4·023	·026	50 38 31·9	9·62	·52
K. 54. . .	6	4 5 0·58	3·957	·025	52 21 18·7	9·60	·51
K. 56. . .	6·7	5 5·22	3·983	·025	51 51 7·8	9·58	·52
K. 80. L. − 1·0 .	6·2	5 54·54	3·955	·024	52 46 38·0	9·53	·51
Ko. 115. L. . .	7·5	7 29·91	4·040	·026	50 17 15·9	9·40	·53
K. 151. L. . .	8	9 22·36	3·963	·023	52 44 5·6	9·25	·52
2 H. 2214. W. .	7	4 10 28·54	3·980	·024	52 18 27·1	9.17	·52
K. 179. L. + ·8 .	8	10 32·35	4·044	·025	50 23 18·9	9·17	·53
Ko. 188. . .	8	10 41·10	4·022	·025	51 0 31·3	9·16	·53
K. 197. L. . .	7·8	11 4·23	4·041	·025	51 28 25·2	9·13	·53
L. 8044. . .	7·4	11 50·58	4·002	·024	51 43 31·8	9·06	·52
K. 234. L. . .	7·5	4 12 13·27	3·991	·024	52 3 33·1	9·04	·52

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Authority and Star's Name	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. + ″
6 B. 980. K. .	7·4	4 12 49·37	4·051	·025	50 21 43·1	8·98	·54
K. 263. . .	7·8	13 49·96	3·985	·023	52 20 49·2	8·91	·53
K. 321. L.+·3 .	7·8	16 11·33	4·028	·024	51 14 14·5	8·73	·53
Ko. 333. L.−·7 .	7·8	16 30·12	3·968	·022	53 1 0·4	8·70	·53
Ko. 377 L. .	8	18 21·57	4·053	·024	50 35 57·7	8·55	·54
K. 423. . .	8	4 20 32·04	4·028	·023	51 28 57·2	8·37	·54
Ko. 433. L. . .	8	21 8·57	4·067	·024	50 23 43·5	8·33	·54
L. 8401. . .	7·8	21 30·27	4·078	·024	50 7 40·8	8·31	·54
Dor. 447. K. * .	6·3	22 8·63	4·074	·023	50 15 48·7	8·24	·55
L. 8426. . .	8	22 27·66	3·993	·022	52 37 2·0	8·23	·53
K. 486. L. . .	8	4 23 14·85	4·033	·022	51 27 37·0	8·16	·54
Ko. 546. L.−·7 .	7·2	26 18·68	3·995	·021	52 45 54·0	7·91	·54
Ko. 550. L.+·4 .	8	26 24·56	4·072	·022	50 31 41·8	7·91	·55
Ko. 575. L.−·9 .	7·2	27 44·09	3·994	·020	52 49 10·7	7·80	·54
Ko. 613. L.−·6 .	8	29 13·30	3·995	·020	52 53 30·4	7·68	·54
K. 621. L. . .	7·7	4 29 27·42	4·033	·021	51 48 23·1	7.66	·55
Ko. 651. . .	7	30 46·57	4·081	·022	50 27 39·7	7·56	·55
Wa. 1972. K.−·6 *	6·2	32 35·70	4·033	·020	51 57 37·9	7.40	·55
Do. 461. K.* .	7	33 4·53	4·008	·020	52 43 43·0	7·36	·55
Ko. 708. L.−·5 .	8	33 24·18	4·036	·020	51 51 15·9	7·35	·55
Ko. 714. L. . .	7	4 33 35·68	4·039	.020	51 48 56·5	7·33	·55
K. 751. . .	8	35 12·78	4·094	·021	50 21 40·7	7·19	·56
Ko. 760. L.−·7 .	7	35 21·13	4·037	·020	51 59 57·8	7·18	·55
Ko. 881. L.−·3 .	8	40 19·72	4·012	·018	52 53 11·4	6·77	·56
4 Gre. 601. A. .	6	40 43·78	4·015	·018	52 44 4·9	6·77	·56
K. 917. L.−·8 .	8	4 41 40·15	4·028	·018	52 27 36·4	6·65	·56
K. 944. L.+1 .	8	43 6·47	4·087	·019	50 55 42·6	6·54	·57
L. 9175. . .	8	47 5·70	4·126	·019	50 1 55·3	6·21	·57
6 B. 996. . .	7·5	47 43·79	4·043	·017	52 20 7·7	6·15	·57
K. 1075. . .	7·3	48 46·17	4·121	·018	50 8 10·6	6·06	·58
Ko. 1086. L. .	7	4 49 14·90	4·027	·016	52 51 54·6	6·03	·56
K. 1097. . .	8	49 33·37	4·122	·018	50 7 0·9	6·00	·58
4 Gre. 627. A.* .	6	49 58·76	4·051	·017	52 18 4·5	5·86	·57
4 Gre. 628. 1 R. .	6	50 55·07	4·101	·017	50 47 49·8	5·89	·57
4 Gr. 629. A. .	6·7	50 58·63	4·113	·017	50 32 13·4	5·87	·58
L. 9334. . .	7·5	4 51 57·32	4·126	·018	50 13 41·5	5·80	·58
L. 9351. . .	7·8	52 21·40	4·084	·017	51 23 56·2	5·77	·57
K. 1169. . .	8	52 24·22	4·034	·016	52 46 41·4	5·77	·57
Ko. 1218. L.+·3 .	7·3	54 23·49	4·030	·015	52 54 45·1	5·60	·57
K. 1228. . .	8	54 42·78	4·087	·016	51 18 37·0	5·57	·58
2 H. 2511. K. .	8	4 55 10·25	4·131	·016	50 12 16·6	5·52	·59
K. 1237. L. . .	8	55 15·35	4·125	·017	50 21 47·2	5·52	·58
K. 1281. L. . .	7·8	56 58·71	4·136	·016	50 8 7·7	5·38	·59
K. 1283. . .	8	57 0·31	4·084	·016	51 27 12·5	5·38	·58
L. 9510. . .	7·5	57 12·76	4·080	·016	51 39 4·3	5·35	·58
K. 1317. L. . .	7·8	4 58 22·85	4·135	·016	50 13 42·2	5·26	·59
Ko. 1319. L.−1·1	8	58 24·85	4·132	·016	50 19 4·1	5·26	·59
K. 1333. L.+·5 .	8	58 52·33	4·128	·016	50 26 23·0	5·22	·59
Ko. 1339. L.+·5 .	8	59 1·20	4·133	·016	50 17 40·0	5·21	·59
K. 1343. L. . .	8	59 9·75	4·060	·015	52 15 11·2	5·19	·58

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		h. m. s.		+ s.	+ s.	° ′ ″	− ″	+ ″
L. 9577. . .	8	4 59 9·93		4·061	·015	52 15 12·6	5·19	·57
L. 9585. . .	8	59 27·42		4·119	·016	50 40 38·9	5·17	·58

Dor. 447. Dup. **6·3**−9″−**6·5**−114° the 1st. Do. 461. Dup. oblong.
Wa. 1972. perhaps a P.M. of +015 should have been adopted, and reckoned from 1869.
4 Gre. 627. Dup. **4**−6″−**7·9**−352°.

5
hours

TABLE II.

		5h.R.A. sec.	6h.R.A. sec.			5h.R.A. sec.	6h.R.A. sec.			5h.R.A. sec.	6h.R.A. sec.
Jan.	1...	11·60	11·74	May	1...	9·91	10·20	Sept.	8...	12·83	12·44
	11...	11·57	11·77		11...	9·88	10·11		18...	13·23	12·84
	21...	11·48	11·75		21...	9·90	10·06		28...	13·62	13·24
	31...	11·36	11·68		31...	9·97	10·06	Oct.	8...	13·99	13·64
Feb.	10...	11·20	11·57	June	10...	10·08	10·10		18...	14·35	14·03
	20...	11·01	11·42		20...	10·24	10·20		28...	14·67	14·40
Mar.	2...	10·82	11·24		30...	10·45	10·34	Nov.	7...	14·97	14·75
	12...	10·63	11·05	July	10...	10·70	10·53		17...	15·22	15·05
	22...	10·43	10·86		20...	10·99	10·76		27...	15·42	15 33
April	1...	10·25	10·66		30...	11·32	11·04	Dec.	7...	15·57	15·55
	11...	10 10	10·48	Aug.	9...	11·67	11·35		17...	16·67	15·72
	21...	9·99	10·32		19...	12·04	11·69		27...	15·71	15·84
May	1...	9·91	10·20		29...	12·43	12·06		37...	15·70	15·90
				Sept.	8...	12·83	12·44				

TABLE III.

Jan. 1	R. A. 5 h. sec.	R. A. 6 h. sec.	Aug. 12	Jan. 1	R. A. 5 h. sec.	R. A. 6 h. sec.	Aug. 12	Jan. 1	R. A. 5 h. sec.	R. A. 6 h. sec.	Aug. 12
1873	0·63	0·68	1891	1882	1·38	1·34	1900	1891	0·63	0·65	1909
1874	0·67	0·76	1892	1883	1·35	1·28	1901	1892	0·64	0·71	1910
1875	0·75	0·86	1893	1884	1·29	1·18	1902	1893	0·70	0·80	1911
1876	0·85	0·98	1894	1885	1·18	1·06	1903	1894	0·79	0·91	1912
1877	0·97	1·10	1895	1886	1·06	0·93	1904	1895	0·90	1·03	1913
1878	1·10	1·21	1896	1887	0·93	0·82	1905	1896	1·02	1·14	1914
1879	1·21	1·29	1897	1888	0·81	0·72	1906	1897	1·14	1·24	1915
1880	1·30	1·35	1898	1889	0·72	0·66	1907	1898	1·25	1·32	1916
1881	1·36	1·37	1899	1890	0·65	0·63	1908	1899	1·33	1·36	1917
1882	1·38	1·34	1900	1891	0·63	0·65	1909	1900	1·37	1·36	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. + ″
6 B. 1041. . .	6·8	5 0 13·25	4·090	·014	51 28 44·7	5·10	·58
L. 9621. . .	8	0 25·44	4·054	·015	52 28 46·3	5·09	·57
Ko. 1383. . .	7·9	0 29·89	4·144	·015	50 0 39·9	5·08	·59
Dor. 520. K.* .	6·7	1 1·93	4·041	·014	52 51 35·8	5·04	·57

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Authority and Star's Name	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. — ″	Sec. Var. + ″
Ko. 1457. L.+·7 .	7·4	5 2 16·18	4·043	·014	52 51 25·5	4·93	·58
Ko. 5. L.+·4 .	7·1	2 44·43	4·146	·015	50 3 19·1	4·90	·59
6 B. 1084. . .	7·9	3 33·82	4·060	·013	52 24 38·5	4·82	·58
Ko. 50. L.+·4 .	6·9	4 1·48	4·145	·013	52 48 34·6	4·78	·58
4 Gre. 656. 1 R. Aur. μ	6·5	4 2·67	4·085	·014	51 39 57·8	4·70	·58
6 B. 1219. . .	7·8	5 4 56·24	4·121	·014	50 47 8·3	4·70	·59
Ko. 173. L.+·3 .	7	7 43·21	4·128	·014	50 40 44·3	4·47	·59
K. 215. . .	8	9 4·68	4·125	·013	50 47 8·8	4·36	·59
L. 9823. . .	8	8 49·31	4·063	·013	52 29 21·1	4·37	·58
4 Gr. 667. 1 R. Aur. λ	5	9 30·05	4·199	·014	50 0 51·8	3·61	·59
K. 237. . .	8	5 9 43·40	4·134	·013	50 33 31·6	4·30	·59
L. 9874. . .	7·3	10 33·09	4·143	·013	50 20 23·6	4·22	·59
6 B. 1257. . .	7·5	10 37·15	4·127	·012	50 47 25·8	4·22	·59
K. 288. L.−1·0 .	7	11 22·56	4·057	·012	52 41 33·5	4·15	·58
Ko. 290. L. . .	8	11 30·79	4·138	·012	50 30 31·2	4·15	·59
Ko. 322. L. . .	7·5	5 12 24·78	4·138	·012	50 33 19·2	4·07	·59
1 Ha. 1410. W. .	7·2	13 12·92	4·068	·011	52 26 56·9	3·99	·59
K. 372. L. . .	8	14 22·33	4·050	·011	52 55 57·0	3·90	·58
6 B. 1289. . .	7·8	14 38·87	4·132	·011	50 45 21·3	3·87	·60
K. 399. L.−·7 .	8	15 12.19	4·069	·011	52 27 23·5	3·83	·59
4 Gre. 677. K. Aur. σ	6	5 15 17·68	4·060	·011	52 44 2·5	3·80	·58
K. 407. L.−·7 .	8	15 36·12	4·062	·011	52 36 56·6	3·79	·59
Ko. 430. W.* .	7·8	16 13·79	4·084	·011	52 4 12·8	3·74	·59
K. 459. . .	8	17 15·20	4·118	·011	51 9 21·6	3·65	·59
K. 533. L.+·3 .	8	19 36·63	4·077	·010	52 19 59·9	3·45	·59
K. 553. L.+·4 .	8	5 20 19·64	4·084	·010	52 10 15·9	3·38	·59
L. 10220. . .	8	20 43·42	4·073	·010	52 27 22·7	3·34	·59
1 Ra. 1489. K. G.	7·7	21 3·82	4·155	·010	50 16 21·0	3·30	·62
1 Ra. 1491. G. .	6·9	21 10·29	4·155	·010	50 16 25·2	3·29	·62
1 Ra. 1493. G. .	7·7	21 27·23	4·164	·010	50 4 6·8	3·28	·61
1 Rad. 1496. W.−·3	7·1	5 21 59·38	4·099	·010	51 46 39·5	3·23	·60
L. 10297. . .	8	22 43·56	4·091	·010	52 0 56·2	3·17	·59
K. 644. L.−·3 .	8	23 6·77	4·091	·010	52 3 15·6	3·14	·59
K. 661. . .	7·8	23 44·23	4·146	·010	50 35 2·9	3·09	·60
K. 665. . .	8	23 56·58	4·118	·010	51 18 32·5	3·06	·60
K. 736. L. . .	8	5 26 1·79	4·086	·009	52 11 6·1	2·89	·59
K. 738. L.−·4 .	7·8	26 6·94	4·091	·009	52 4 0·8	2·88	·59
Ko. 763. . .	8	26 48·32	4·130	·009	51 3 6·9	2·82	·60
K. 786. . .	8	27 21·24	4·060	·008	52 56 21·6	2·78	·59
1 Ra. 1515. G. .	7·4	27 24·73	4·104	·009	51 44 21·2	2·76	·61
Ko. 818. . .	7·7	5 28 10·04	4·059	·008	52 59 42·9	2·70	·59
1 Ra. 1518. . .	8·4	28 45·46	4·115	·008	51 28 18·0	2·65	·60
K. 845. L. . .	7·8	28 49·51	4·084	·008	52 20 4·9	2·65	·59
K. 875. L.−·3 .	8	29 31·10	4·085	·008	52 20 15·8	2·59	·59
L. 10533. . .	7·6	29 36·38	4·093	·008	52 6 0·6	2·58	·59
L. 10560. . .	7	5 30 8·87	4·094	·008	52 5 9·3	2·53	·59
6 B. 1373. K. .	7·8	30 23·67	4·166	·008	50 11 24·5	2·50	·61
L. 10569. . .	8	30 26·43	4·093	·008	52 6 59·7	2·50	·59
6 Bo. 1377. K.−·4	7·5	30 55·24	4·165	·008	50 14 8·9	2·46	·61
6 B. 1282. . .	7·8	31 22·36	4·071	·007	52 44 20·1	2·42	·59

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		h. m. s.		+ s.	+ s.	° ′ ″	− ″	+ ″
1 Ra. 1532. 6 B. .	8·2	5 31 29·12		4·114	·007	51 33 15·6	2·41	·60
6 B. 1379. . .	7·9	31 30·31		4·158	·008	50 26 2·6	2·41	·61
K. 964. . .	8	31 52·22		4·128	·008	52 9 26·7	2·38	·60
1 Ra. 1533. G. .	8·3	32 1·91		4·102	·007	51 52 49·6	2·36	·60
1 Ra. 1535. K. .	8·1	32 29·21		4·063	·007	52 57 3·1	2·32	·59
1 Ra. 1538. G. .	7·9	5 32 49·50		4·103	·007	51 52 6·3	2·29	·60
1 Ra. 1541. W. .	7·4	33 17·91		4·103	·007	51 52 0·0	2·25	·60
K. 1128. L. . .	7·5	35 25·21		4·115	·007	51 33 32·6	2·07	·60
La. 10793. . .	7·5	36 19·74		4·085	·007	52 23 46·8	1·99	·59
6 Bon. 1312. W. .	7	36 30·69		4·114	·007	52 45 12·6	1·46	·59
K. 1174. . .	7·6	5 36 38·63		4·138	·007	50 58 48·4	1·96	·60
K. 1259. 6 B.‡+·3.	8	38 40·62		4·100	·006	52 1 59·4	1·78	·60
4 Gr. 744. 1 R. .	6·7	39 14·48		4·156	·006	50 30 46·1	1·70	·61
4 Gr. 746. 1 R. Aur. τ	5	39 35·09		4·142	·006	50 51 51·4	1·65	·60
K. 1291. . .	8	39 37·85		4·113	·006	52 41 16·9	1·70	·60
Ar. 1294. W. .	7·5	5 39 48·32		4·129	·006	51 18 19·–	1·68	·60
Ar. 1298. W. .	8	40 8·02		4·126	·006	51 20 47·–	1·66	·60
K. 1333. L.—·9 .	7·8	40 55·21		4·081	·006	52 33 40·4	1·58	·60
4 Gr. 751. K. Aur. υ	5	41 34·76		4·076	·005	52 43 58·9	1·48	·59
4 G. 753. 1 R. Aur. υ	4	41 53·22		4·141	·006	50 53 27·0	1·52	·60
6 B. 1430. . .	7·7	5 42 18·43		4·161	·005	50 28 20·0	1·46	·61
K. 1380. . .	8	42 29·52		4·095	·005	52 11 54·3	1·45	·60
Do. 646. K.* .	7	42 40·36		4·122	·005	51 28 31·1	1·43	·60
6 B. 1435. . .	7·3	43 1·72		4·162	·005	50 27 36·8	1·40	·61
2 H. 2765. 1 H. .	7	44 1·01		4·077	·004	52 41 51·0	1·31	·60
6 B. 1333. . .	7·8	5 47 12·36		4·125	·004	51 26 40·9	1·04	·60
L. 11158. . .	7·5	47 21·89		4·114	·005	51 44 0·1	1·02	·60
L. 11171. . .	7·3	47 53·02		4·127	·005	51 22 41·0	0·98	·60
K. 1562. L.—·6 .	7·2	48 20·85		4·086	·004	52 30 6·2	0·94	·60
K. 1582. . .	7	48 57·36		4·137	·004	51 7 33·1	0·88	·60
K. 1586. . .	8	5 49 7·76		4·170	·004	50 18 28·5	0·87	·61
6 B. 1343. . .	7·8	49 53·49		4·128	·003	51 23 22·5	0·80	·60
3 Gr. 447. 2 R. Aur. θ	3	50 14·39		4·079	·004	52 47 54·9	0·66	·60
K. 1646. . .	7·3	50 39·95		4·174	·003	50 8 6·7	0·74	·61
1 Ra. 1609. K. .	7·7	52 26·01		4·124	·003	51 32 49·2	0·58	·60
1 Ra. 1611. K. .	7·2	5 52 29·40		4·131	·003	51 17 9·7	0·57	·60
1 Rad. 1622. 1 H.	6·9	55 4·14		4·126	·002	51 25 24·4	0·35	·60
1 Rad. 1624. K. .	6·4	55 29·79		4·103	·002	52 1 57·1	0·31	·60
4 Gr. 781. 1 R. .	6	56 59·47		4·124	·002	51 30 31·1	0·17	·60
Ko. 1885. L.—·5 .	8	57 40·13		4·075	·002	52 49 26·8	0·12	·60
1 Ra. 1634. W. .	6·8	5 57 57·65		4·108	·002	51 54 25·2	0·09	·60
K. 1905. . .	8	58 25·20		4·152	·002	50 46 32·9	0·06	·61
K. 1913. W.—·5 .	7	58 38·64		4·105	·002	52 0 19·4	0·03	·60
K. 1918. L.—·4 .	8	58 47·78		4·095	·001	52 15 27·8	0·02	·60
6 Bo. 1533. . .	8	59 57·17		4·151	·0	50 48 14·4	−0·08	·61
K. 1977. L. . .	7·5	5 59 59·16		4·116	·0	51 41 17·8	+0·08	+·60

Dor. 520. Dup. **6·7**−2″−**7**−219° the mean. Ko. 430. Dup. **7·3**−9″−**8**−343° the 2nd.
Do. 646. Dup. **7**−1″−**8·3**−193°.

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		6h.R.A.	7h.R.A.			6h.R.A.	7h.R.A.			6h.R.A.	7h.R.A.
		sec.	sec.			sec.	sec.			sec.	sec.
Jan.	1...	11·74	11·75	May	1...	10·20	10·54	Sept.	8...	12·44	12·04
	11...	11·77	11·96		11...	10·11	10·40		18...	12·84	12·41
	21...	11·75	11·91		21...	10·06	10·30		28...	13·24	12·81
	31...	11·68	11·91		31...	10·06	10·23	Oct.	8...	13·64	13·21
Feb.	10...	11·57	11·85	June	10...	10·10	10·21		18...	14 03	13·61
	20...	11·42	11·76		20...	10·20	10·24		28...	14·40	14·00
Mar.	2...	11·24	11·62		30...	10·34	10·31	Nov.	7...	14·75	14·38
	12...	11·05	11·46	July	10...	10·53	10·43		17...	15·05	14·74
	22...	10·86	11·27		20...	10·76	10·60		27...	15·33	15·07
April	1...	10·66	11·08		30...	11·04	10·81	Dec.	7...	15·55	15·35
	11...	10·48	10·88	Aug.	9...	11·35	11·06		17...	15·72	15·59
	21...	10·32	10·70		19...	11·69	11·46		27...	15·84	15·78
May	1...	10·20	10·54		29...	12·06	11·68		37...	15·90	15·92
				Sept.	8...	12·44	12·04				

TABLE III.

	R. A.	R. A.			R. A.	R. A.			R. A.	R. A.	
Jan. 1	6 h.	7 h.	Aug. 12	Jan. 1	6 h.	7 h.	Aug. 12	Jan. 1	6 h.	7 h.	Aug. 12
	sec.	sec.			sec.	sec.			sec.	sec.	
1873	0·68	0·75	1891	1882	1·34	1·28	1900	1891	0·65	0·70	1909
1874	0·76	0·86	1892	1883	1·28	1·18	1901	1892	0·71	0·79	1910
1875	0·86	0·98	1893	1884	1·18	1·06	1902	1893	0·80	0·91	1911
1876	0·98	1·11	1894	1885	1·06	0·93	1903	1894	0·91	1·03	1912
1877	1·10	1·22	1895	1886	0·93	0·81	1904	1895	1·03	1·15	1913
1878	1·21	1·30	1896	1887	0·82	0·71	1905	1896	1·14	1·25	1914
1879	1·29	1·36	1897	1888	0·72	0·65	1906	1897	1·24	1·33	1915
1880	1·35	1·37	1898	1889	0·66	0·62	1907	1898	1·32	1·37	1916
1881	1·37	1·35	1899	1890	0·63	0·64	1908	1899	1·36	1·37	1917
1882	1·34	1·28	1900	1891	0·65	0·70	1909	1900	1·36	1·33	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. + ″
K. 1990. L.—·4 .	8	6 0 21·28	4·090	·0	52 24 33·0	0·12	·60
Ko. 54. L. . .	7	4 0·06	4·075	·0	52 48 47·8	0·44	·60
K. 72. L. . .	7·8	4 32·18	4·081	·0	52 38 58·4	0·48	·60
I Ra. 1676. G. .	7·7	4 37·87	4·170	·0	50 17 40·0	0·49	·61
6 B. 1559. . .	8	5 33·43	4·181	·0	50 1 15·6	0·57	·61
L. 11823. . .	7·5	6 6 32·51	4·093	·0	52 19 32·1	0·66	·60
6 B. 1575. . .	7	7 52·39	4·178	·001	50 6 6·0	0·78	·61
1 Ra. 1694. G. .	6·9	8 2·96	4·162	·001	50 29 5·4	0·79	·61
6 B. 1580. . .	8	8 19·34	4·148	·001	50 51 53·5	0·82	·61
1 Ra. 1698. K. .	7·6	9 3·01	4·113	·002	51 43 10·3	0·88	·60
1 Ra. 1702. G. .	7·2	6 10 6·01	4·122	·002	51 31 0·3	0·97	·60
L. 12010. . .	7·8	11 35·15	4·103	·001	52 0 31·6	1·10	·60
L. 12087. . .	7·8	13 46·07	4·106	·002	51 54 14·5	1·29	·60
K. 389. L.—·3 .	7·7	14 51·08	4·127	·002	51 21 55·4	1·39	·60
L. 12134. . .	6·8	14 55·78	4·079	·002	52 37 20·6	1·40	·60
L. 12173. W. .	7·5	6 16 6·58	4·106	·002	51 53 12·0	1·50	·60

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		h. m. s.		+ s.	− s.	° ′ ″	+ ″	+ ″
L. 12183. . .	7·8	6 16 22·52		4·179	·002	50 0 13·8	1·52	·61
K. 451. . .	7·2	16 52·86		4·168	·003	50 15 29·6	1·56	·61
Ko. 461. . .	7·8	17 18·84		4·141	·003	50 57 24·1	1·60	·60
K. 468. . .	8	17 23·02		4·078	·003	52 37 51·6	1·60	·59
K. 479. . .	7·9	17 57·23		4·168	·003	50 5 15·9	1·65	·61
6 B. 1635. . .	7·6	6 18 50·30		4·146	·004	50 48 54·0	1·74	·60
K. 516. . .	7·4	19 5·70		4·140	·003	50 57 37·7	1·76	·60
1 H. 1862. L.−·6	7·4	19 32·71		4·167	·004	50 16 19·3	1·80	·61
K. 557. . .	8	20 22·77		4·140	·004	50 57 19·1	1·87	·60
K. 567. . .	8	20 33·98		4·096	·003	52 5 44·0	1·88	·60
K. 586. L.+·6 .	7	6 21 18·10		4·171	·004	50 9 47·0	1·95	·61
K. 611. L.−·5 .	6·5	21 58·56		4·072	·004	52 44 22·7	2·00	·59
L. 12437. . .	7·2	23 15·36		4·171	·004	50 7 42·5	2·12	·61
1 Ra. 1758. G.−·4	7·1	23 57·99		4·156	·005	50 27 46·6	2·18	·60
1 Ra. 1761. G. .	6·8	24 42·02		4·104	·005	51 49 56·0	2·25	·60
1 Rad. 1763. G.* .	6·9	6 25 2·28		4·121	·005	51 22 2·0	2·28	·61
K. 725. . .	7·2	25 33·61		4·066	·005	52 50 30·2	2·32	·59
D. 745. W.* . .	7·1	25 46·30		4·091	·005	52 11 18·7	2·34	·60
6 B. 1537. . .	8	26 39·74		4·101	·005	51 54 20·3	2·42	·59
4 G. 841. 1 R. .	6	26 53·57		4·118	·005	51 27 23·2	2·45	·60
Ko. 774. . .	8	6 27 3·95		4·130	·005	51 6 50·4	2·45	·60
6 B. 1546. . .	8	27 19·22		4·074	·005	52 37 29·7	2·48	·59
4 G. 846. 1 R. .	5·6	28 55·92		4·150	·006	50 30 5·6	2·73	·60
Ko. 836. . .	8	28 59·95		4·067	·005	52 46 45·0	2·62	·59
K. 834. L.−·5 .	6·1	29 3·27		4·174	·006	49 59 36·6	2·63	·60
1 Ha. 1944. K. .	7·8	6 30 37·29		4·090	·006	52 8 26·9	2·77	·59
L. 12708. . .	8	30 57·01		4·072	·005	52 37 33·8	2·79	·59
L. 12718. . .	7·5	31 25·23		4·145	·006	50 39 13·8	2·83	·60
1 Rad. 1794. G. .	7·1	32 52·82		4·132	·007	50 59 19·2	2·96	·59
K. 974. L.−·7 .	7·8	32 49·77		4·065	·006	52 47 16·9	2·95	·59
1 Ha. 1966. W. .	6·7	6 33 39·71		4·067	·006	52 44 1·4	3·03	·59
K. 1019. L.−1·0 .	8	33 55·68		4·061	·006	52 52 10·3	3·05	·59
1 Ham. 1973 KL+·3	7·8	34 38·32		4·061	·006	52 53 5·7	3·11	·58
K. 1062. L.+·3 .	7	35 25·39		4·148	·007	50 30 9·5	3·18	·60
K. 1075. L. . .	7·5	35 48·42		4·110	·007	51 29 30·1	3·22	·60
K. 1093. . .	7	6 36 17·23		4·132	·007	50 54 11·9	3·25	·59
L. 12951. W. .	7·3	37 43·53		4·116	·007	51 19 49·5	3·38	·59
1 Ha. 1987. . .	7	39 6·06		4·096	·008	51 49 56·0	3·50	·59
1 H. 1990. . .	7·1	39 19·28		4·076	·008	52 21 26·0	3·52	·58
1 Ha. 1991. KL.+·3	7·5	39 20·25		4·056	·007	52 53 55·6	3·52	·58
6 B. 1614. . .	8	6 39 58·01		4·105	·009	51 32 56·3	3·57	·59
1 Ha. 1992. K. .	7·3	40 4·86		4·149	·009	50 23 0·6	3·58	·59
6 Bo. 1592. . .	6·3	40 8·72		4·076	·008	52 20 59·9	3·59	·58
1 Ha. 1994. . .	8	40 23·29		4·158	·009	50 8 30·2	3·61	·60
1 Ha. 1995. L.+·5	7·5	40 34·94		4·158	·009	50 8 7·2	3·62	·60
1 Ha. 1999. . .	8	6 41 42·99		4·114	·009	51 15 49·6	3·72	·59
4 G. 871. 1 R. .	6	43 19·18		4·127	·009	50 59 2·6	3·86	·59
2 Rad. 734. 1 R. .	6·6	43 32·65		4·107	·009	51 24 26·6	3·89	·59
1 H. 2011. L.+·3 .	7·7	44 2·59		4·102	·009	51 32 19·9	3·93	·59
1 Ham. 2012. .	7·3	44 9·29		4·134	·009	50 40 49·5	3·93	·59
4 G. 872. 1 R. .	6	6 44 16·53		4·109	·009	51 20 39·8	3·94	·59
Ko. 1355. . .	7·6	45 7·77		4·051	·008	52 54 28·0	4·02	·58
1 Ra. 1840. G. .	6·9	45 54·25		4·085	·009	51 55 42·0	4·09	·59

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Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. + ″
1 Ham. 2020. .	7·7	6 46 5·14	4·148	·010	50 17 27·8	4·10	·59
Ko. 1397. L.−·5 .	8	46 41·32	4·050	·009	52 53 39·4	4·15	·58
1 Ha. 2030. K.+·3	6·9	47 42·47	4·065	·009	52 26 41·1	4·24	·58
1 Ra. 1852. G. .	7·9	48 44·89	4·086	·010	51 50 51·3	4·32	·57
1 Ham. 2039. K. .	7	49 4·97	4·144	·011	50 17 58·6	4·36	·59
1 Ham. 2040. .	8	6 49 10·65	4·153	·011	50 3 20·1	4·36	·59
2 R. 724. 1 R. .	6·4	49 24·51	4·088	·010	51 46 40·1	4·39	·58
Dor. 794. . .	7	49 52·83	4·053	·010	52 44 7·3	4·43	·59
Σ Dor. 794. . .	7·7	49 54·62	4·053	·012	52 44 27	4·43	·57
K. 1537. . .	7·9	51 27·28	4·128	·010	50 39 7·1	4·56	·59
L. 13542. . .	8	6 53 49·46	4·068	·010	52 11 10·5	4·76	·58
K. 1638. L.−·3 .	7	54 40·67	4·064	·011	52 15 18·6	4·83	·57
K. 1776. L.−·6 .	6·5	59 0·29	4·057	·012	52 21 41·3	5·20	·57
1 H. 2102. K.+·5	8	59 14·52	4·059	·012	52 16 18·6	5·21	·57

1 Rad. 1763. Dup. **7·4−3″−8−134°.** D. 745. Dup. **7·1−6″−8·2−25°** the 1st.

7 hours

TABLE II.

		7h.R.A. sec.	8h.R.A. sec.			7h.R.A. sec.	8h.R.A. sec.			7h.R.A. sec.	8h.R.A. sec.
Jan.	1...	11·75	11·65	May	1...	10·54	10·91	Sept.	8...	12·04	11·64
	11...	11·96	11·83		11...	10·40	10·74		18...	12·41	11·97
	21...	11·91	11·96		21...	10·30	10·60		28...	12·81	12·33
	31...	11·91	12·03		31...	10·23	10·48	Oct.	8...	13·21	12·71
Feb.	10...	11·85	12·04	June	10...	10·21	10·40		18...	13·61	13 11
	20...	11·76	12·00		20...	10·24	10·36		28...	14·00	13·50
Mar.	2...	11·62	11·92		30...	10·31	10·36	Nov.	7...	14·38	13·90
	12...	11·46	11·80	July	10...	10·43	10·41		17...	14·74	14·28
	22...	11·27	11·65		20...	10·60	10·51		27...	15·07	14·65
April	1...	11·08	11·47		30...	10·81	10·65	Dec.	7...	15·35	14·98
	11...	10·88	11·28	Aug.	9...	11·06	10·83		17...	15·59	15·28
	21...	10 70	11·10		19...	11·46	11·06		27...	15·78	15·53
May	1...	10·54	10·91		29...	11·86	11·33		37...	15·92	15·74
				Sept.	8...	12·04	11·64				

TABLE III.

Jan. 1	R. A. 7 h. sec.	R. A. 8 h. sec.	Aug. 12	Jan. 1	R. A. 7 h. sec.	R. A. 8 h. sec.	Aug. 12	Jan. 1	R. A. 7 h. sec.	R. A. 8 h. sec.	Aug. 12
1873	0·75	0·84	1891	1882	1·28	1·20	1900	1891	0·70	0.77	1909
1874	0·86	0 97	1892	1883	1·18	1·07	1901	1892	0·79	0·89	1910
1875	0·98	1·11	1893	1884	1·06	0·94	1902	1893	0·91	1·03	1911
1876	1·11	1·23	1894	1885	0·93	0·81	1903	1894	1·03	1·15	1912
1877	1·22	1·32	1895	1886	0·81	0·70	1904	1895	1·15	1·27	1913
1878	1·30	1·38	1896	1887	0·71	0·63	1905	1896	1·25	1·35	1914
1879	1·36	1·40	1897	1888	0·65	0·60	1906	1897	1·33	1·39	1915
1880	1·37	1·37	1898	1889	0·62	0 61	1907	1898	1·37	1·39	1916
1881	1·35	1·30	1899	1890	0·64	0·67	1908	1899	1·37	1·35	1917
1882	1·28	1·20	1900	1891	0·70	0·77	1909	1900	1·33	1·27	1918

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MEAN PLACES OF FIXED STARS FOR JANUARY 1, 1875.

AUTHORITY AND STAR'S NAME	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ′	Sec. Var. + ″
2 Gr. 536. D.	8·4	7 0 33·75	4·080	·013	51 40 17·4	5·33	·58
6 B. 1704.	7·8	1 31·21	4·081	·013	51 36 13·2	5·41	·57
4 Gre. 896. 1 R.	5	1 53·99	4·127	·013	50 28 40·4	5·44	·58
1 Ra. 1904. G.	8·4	4 1·37	4·073	·015	51 41 0·6	5·62	·56
1 Ra. 1919. G.	7	7 59·96	4·097	·015	50 54 12·0	5·96	·57
6 B. 1726. W.	8	7 8 20·10	4·079	·014	51 24 54·2	5·99	·56
1 Ra. 1926. K.	7·1	9 10·83	4·088	·015	51 6 14·6	6·06	·57
K. 330. L.−1·1	8	11 32·43	4·101	·015	50 40 39·9	6·25	·57
K. 341.	7·1	11 53·66	4·048	·015	52 6 0·8	6·28	·56
K. 360. L.−·6	8	12 23·76	4·102	·016	50 37 16·5	6·32	·57
1 Ra. 1937. G.	6·7	7 12 30·14	4·095	·016	50 46 11·2	6·34	·58
K. 412. L.−1·6	8	14 24·98	4·099	·016	50 37 39·8	6·49	·56
L. 14356.	8	16 31·05	4·049	·015	51 55 52·9	6·67	·56
K. 492. L.−·3	7	17 40·76	4·100	·017	50 26 3·9	6·76	·56
1 Rad. 1958. 1 H.	7·1	17 52·69	4·076	·017	51 5 5·7	6·77	·55
K. 571.	8	7 20 1·24	4·020	·016	52 35 5·7	6·97	·55
1 Ra. 1969. G. 1 H.	7·7	20 18·00	4·064	·017	51 18 16·8	6·99	·57
K. 563.	8	20 22·82	4·096	·017	50 25 19·8	6·99	·56
1 Ra. 1970. G.	7·2	20 30·86	4·054	·017	51 34 22·7	6·99	·55
K. 599.	8	21 15·21	4·026	·016	52 20 32·0	7·06	·55
1 Rad. 1973. G.	6·9	7 22 13·79	4·077	·018	50 50 34·9	7·13	·55
K. 666. L.−·7	7·8	23 27·30	4·010	·016	52 42 28·0	7·24	·54
K. 683. L.−·6	6·5	23 50·10	4·015	·016	52 32 55·8	7·27	·54
K. 684.	8	23 50·96	4·019	·017	52 24 29·1	7·27	·54
K. 766.	8	26 40·46	4·036	·018	51 47 47·1	7·50	·54
D. 897. K.	7·5	7 27 43·93	4·068	·018	50 51 22·2	7·58	·53
6 Bo. 1979. K.	7·2	28 6·45	4·068	·019	50 50 41·2	7·62	·54
1 Ra. 1994. G.	7·3	28 28·17	4·045	·018	51 27 46·5	7·64	·53
1 Rad. 1999. G.	8	29 6·68	4·046	·018	51 23 13·5	7·70	·55
Ko. 858. L.−·9	8	29 43·89	4·061	·019	50 55 20·2	7·75	·55
1 Rad. 2006. G.	6·2	7 30 35·70	4·045	·018	51 22 18·0	7·82	·55
4 B. 1988.	7·8	31 30·—	4·074	·018	50 30 37·—	7·89	·54
6 B. 1756.	7·5	32 6·46	4·011	·018	52 16 56·8	7·94	·53
Ko. 961.	7	32 52·74	3·998	·018	52 36 13·5	8·00	·53
K. 1013.	7	34 28·15	4·054	·020	50 52 2·4	8·13	·54
K. 1029.*	9	7 35 11·18	4·080	·020	50 6 52·2	8·19	·54
K. 1045.*	7	35 47·39	4·048	·020	50 59 15·0	8·24	·54
K. 1048.*	9	35 58·34	4·077	·020	50 9 11·0	8·25	·54
K. 1079. L.+·7	8	36 59·22	4·030	·020	51 25 39·2	8·33	·53
K. 1083. L.+·3	5·3	37 3·42	4·005	·019	52 10 56·9	8·33	·53
K. 1148. L.+·4	8	7 39 47·72	3·987	·019	52 33 55·5	8·55	·52
K. 1152.	8	39 58·14	4·003	·020	50 3 11·1	8·57	·53
6 B. 1820.	8	40 6·95	4·016	·020	51 40 5·4	8·58	·52
K. 1178.	7	41 7·88	4·033	·021	51 5 36·4	8·66	·53
K. 1193. L.	7·7	41 32·12	3·986	·020	52 28 29·7	8·69	·52
K. 1195. W.	6·8	7 41 41·99	3·982	·019	52 36 12·6	8·71	·52
K. 1226.	7·4	42 57·10	4·064	·022	50 8 39·7	8·80	·53
6 Bo. 2022. K.+·3	7	43 41·14	4·060	·022	50 11 51·9	8·86	·53
K. 1254.	7·8	44 11·62	4·061	·022	50 8 44·1	8·90	·53
1 Gr. 706. K.	8	44 39·70	3·965	·020	52 56 11·4	8·94	·52

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Authority and Star's Name	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. + ″
K. 1281 . .	8	7 45 14·96	4·065	·022	49 57 39·1	8·98	·53
K. 1297. L. . .	7·8	45 37·82	3·978	·020	52 28 47·4	9·02	·52
6 B. 1836 . .	7·9	45 41·03	4·012	·022	51 27 53·6	9·02	·52
K. 1306. L.−·4 .	8	45 58·05	3·970	·020	52 41 37·4	9·05	·52
6 Bo. 2031. W. .	7	46 12·56	4·048	·023	50 23 14·5	9·06	·52
1 Gr. 708. 6 B. .	8·3	7 47 12·75	3·965	·020	52 46 25·5	9·14	·52
K. 1358. . .	7	48 10·77	4·023	·022	50 57 13·5	9·22	·52
K. 1399. L.+·3 .	8	50 1·59	3·966	·021	52 33 32·2	9·36	·51
K. 1406. . .	8	50 22·90	4·021	·022	51 1 45·9	9·39	·52
Ko. 1440. . .	8	51 57·97	4·017	·023	50 54 38·9	9·50	·51
6 Bon. 1819. .	6·9	7 53 54·39	3·960	·022	52 30 59·3	9·66	·50
Ko. 1524. . .	8	55 17·69	4·009	·023	50 55 37·6	9·76	·51
6 B. 1861. . .	6·8	58 10·92	3·998	·024	51 3 42·2	9·99	·50
6 B. 1865. . .	7	58 41·41	3·995	·024	51 6 58·2	10·03	·50
K. 1612. L.+·7 .	7·7	58 46·53	3·973	·023	51 46 22·8	10·03	·50
Dor. 952.* . .	8	7 59 51·07	3·971	·023	51 45 55·5	10·11	·50

K. 1029. K. 1045. and K. 1048. mags. doubtful; Dor. 952. Dup. **8** − 27″ − **8·5** − 340° the 2nd.

8
hours

TABLE II.

		8h.R.A. sec.	9h.R.A. sec.			8h.R.A. sec.	9h.R.A. sec.			8h.R.A. sec.	9h.R.A. sec.
Jan.	1...	11·65	11·44	May	1...	10·91	11·29	Sept.	8...	11·64	11·27
	11...	11·83	11·68		11...	10·74	11·11		18...	11·97	11·55
	21...	11·96	11·88		21...	10·60	10·93		28...	12·33	11·86
	31...	12·03	12·02		31...	10·48	10·78	Oct.	8...	12·71	12·20
Feb.	10...	12·04	12·11	June	10...	10·40	10·65		18...	13·11	12·56
	20...	12·00	12·14		20...	10·36	10·56		28...	13·50	12·94
Mar.	2...	11·92	12·13		30...	10·36	10·49	Nov.	7...	13·90	13·33
	12...	11·80	12·06	July	10...	10·41	10·47		17...	14·28	13·72
	22...	11·65	11·96		20...	10·51	10·50		27...	14·65	14·10
April	1...	11·47	11·82		30...	10·65	10·56	Dec.	7...	14·98	14·47
	11...	11·28	11·66	Aug.	9...	10·83	10·67		17...	15·28	14·81
	21...	11·10	11·48		19...	11·06	10·83		27...	15·53	15·12
May	1...	10·91	11·29		29...	11·33	11·03		37...	15·74	15·39
				Sept.	8...	11·64	11·27				

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Jan. 1	R.A. 8 h. sec.	R.A. 9 h. sec.	Aug. 12	Jan. 1	R.A. 8 h. sec.	R.A. 9 h. sec.	Aug. 12	Jan. 1	R.A. 8 h. sec.	R.A. 9 h. sec.	Aug. 12
1873	0·84	0·94	1891	1882	1·20	1·11	1900	1891	0·77	0·86	1909
1874	0·97	1·09	1892	1883	1·07	0·96	1901	1892	0·89	1·00	1910
1875	1·11	1·22	1893	1884	0·94	0·82	1902	1893	1·03	1·14	1911
1876	1·23	1·33	1894	1885	0·81	0·70	1903	1894	1·15	1·27	1912
1877	1·32	1·40	1895	1886	0·70	0·61	1904	1895	1·27	1·36	1913
1878	1·38	1·43	1896	1887	0·63	0·57	1905	1896	1·35	1·42	1914
1879	1·40	1·41	1897	1888	0·60	0·57	1906	1897	1·39	1·43	1915
1880	1·37	1·35	1898	1889	0·61	0·63	1907	1898	1·39	1·39	1916
1881	1·30	1·24	1899	1890	0·67	0·73	1908	1899	1·35	1·31	1917
1882	1·20	1·11	1900	1891	0·77	0·86	1909	1900	1·27	1·19	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. + ″
K. 1680. L.+·3	8	8 1 4·67	3·984	·024	51 15 57·5	10·21	·50
1 Rad. 2096. G.	6·5	1 45·25	3·994	·024	50 53 54·9	10·26	·51
K. 1703.	8	1 57·01	3·931	·022	52 50 36·2	10·27	·49
K. 30. L.	7·5	3 12·85	4·017	·025	50 9 17·6	10·37	·50
Dor. 972.*	8	6 17·68	3·976	·025	51 8 26·1	10·60	·49
K. 165. L.+1·2	7·8	8 8 39·64	3·929	·024	52 26 43·4	10·77	·48
K. 172. L.	7·3	8 53·45	3·924	·024	52 33 31·5	10·79	·48
K. 177.	7·9	9 9·59	3·945	·024	51 52 38·7	10·81	·48
K. 196.	8	9 35·74	3·970	·025	51 3 55·6	10·84	·48
K. 197.	7·6	9 49·79	4·004	·026	50 0 55·8	10·85	·49
K. 225.	8	8 10 59·41	3·960	·025	51 15 42·1	10·94	·48
K. 239. L.	8	11 37·07	3·975	·026	50 43 42·9	10·99	·48
K. 354. L.	7·3	15 53·63	3·917	·025	52 12 27·8	11·30	·47
L. 16446.	7·5	16 33·82	3·904	·025	52 36 38·2	11·35	·47
Do. 991.*	8	16 49·63	3·920	·025	52 2 55·9	11·37	·47
K. 393. L.	8	8 17 21·45	3·891	·024	52 57 31·5	11·41	·46
6 Bo. 1864.	7·4	18 53·37	3·899	·025	52 44 37·5	11·57	·46
K. 443. L.+·3	7·8	19 37·48	3·955	·027	50 42 49·5	11·57	·47
K. 469. L.−·3	8	20 27·83	3·896	·025	52 30 55·8	11·63	·46
K. 475.	8	20 45·88	3·967	·028	50 12 52·0	11·65	·47
6 B. 1916.	7	8 21 31·56	3·931	·027	51 17 29·1	11·71	·46
K. 497. cL.	6·5	21 51·02	3·898	·026	52 19 4·8	11·73	·46
1 Rad. 2164. G.	6·3	23 24·31	3·903	·026	51 33 25·9	12·04	·45
K. 553. 6 B.‡	8	23 58·07	3·912	·027	51 40 50·3	11·88	·46
K. 561.	8	24 12·01	3·920	·027	51 24 44·2	11·90	·46
K. 626. L.	7·7	8 27 4·37	3·951	·029	50 9 3·0	12·10	·46
K. 688. L.	7·5	28 50·90	3·873	·026	52 32 42·5	12·22	·44
K. 773. L.+·4	7·7	31 13·25	3·900	·028	51 24 4·5	12·38	·44
K. 818. L.+·5	8	32 36·71	3·894	·028	51 28 14·5	12·48	·44
Ko. 830. L.−·4	7·6	33 8·15	3·923	·029	50 29 40·1	12·52	·44
6 B. 2143.	7·5	8 33 40·19	3·913	·029	50 44 46·9	12·56	·44
K. 869. L.	7·2	34 9·34	3·850	·026	52 50 17·7	12·58	·43
K. 879. L.	7	34 45·04	3·853	·027	52 37 47·1	12·62	·43
K. 901. L.	8	35 24·50	3·858	·027	52 27 46·2	12·67	·43
K. 914. W.	7	36 11·77	3·862	·027	52 15 20·6	12·72	·43

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Authority and Star's Name	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. + ″
K. 946. L. . .	7·1	8 37 20·45	3·879	·028	51 30 12·8	12·80	·43
K. 969. L.+·4 .	7·6	38 26·60	3·923	·030	49 56 43·6	12·87	·43
1 Ra. 2206. G.* .	7·3	39 30·83	3·882	·029	51 11 44·6	12·95	·43
K. 1027. L. . .	7·8	41 15·07	3·835	·027	52 39 33·2	13·07	·42
Ko. 1030. . .	8	41 18·73	3·880	·029	51 4 20·7	13·07	·42
K. 1093. L.+·7 .	8	8 43 48·62	3·834	·028	52 27 17·4	13·24	·42
K. 1104. L. . .	7	44 38·15	3·893	·030	50 16 29·9	13·29	·42
K. 1161. . .	7·8	46 53·32	3·873	·030	50 42 35·5	13·43	·41
K. 1182. L. . .	7·9	47 38·46	3·827	·028	52 16 49·1	13·48	·41
Wa. 3762. K.+·4.	7·2	48 20·39	3·853	·029	51 15 32·2	13·53	·41
1 Rad. 2248. G. .	6·4	8 51 6·47	3·826	·029	51 54 37·7	13·71	·41
1 Rad. 2255. G. .	7·4	52 51·13	3·849	·032	50 51 12·8	13·82	·40
1 Ra. 2258. G. .	7·4	54 3·57	3·822	·032	51 39 39·0	13·90	·40
1 Rad. 2260. G. .	7	54 19·79	3·847	·032	50 45 53·8	13·91	·39
1 Rad. 2269. Ko. .	7·9	56 26·86	3·831	·032	51 3 46·9	14·05	·39
3 Gre. 689. 1 R. .	5	8 57 6·20	3·831	·030	51 2 58·5	14·09	·39
La. 17894. . .	8	57 11·60	3·820	·030	51 24 37·2	14·09	·39
1 Ra. 2274. GK.−·6	6·9	57 22·88	3·825	·030	51 13 22·3	14·11	·40
K. 1414. . .	8	57 33·04	3·836	·031	50 48 17·3	14·11	·39
L. 17933. . .	8	58 24·31	3·789	·029	52 25 20·9	14·17	·39

Dor. 972. Dup. **8**−12″−**9**−104° the 1st.
1 Ra. 2206. Dup. **7**−9″−**8·7**−41° the 1st.
Dor. 991. Dup. **8**−10″−**9**−47° the 1st.

9
hours

TABLE II.

		9h.RA sec.	10h.RA sec.			9h.RA sec.	10h.RA sec.			9h.RA sec.	10h.RA sec.
Jan.	1...	11·44	11·13	May	1...	11·29	11·65	Sept.	8...	11·27	10·96
	11...	11·68	11·43		11...	11·11	11·47		18...	11·55	11·16
	21...	11·88	11·69		21...	10·93	11·29		28...	11·86	11·41
	31...	12·02	11·90		31...	10·78	11·11	Oct.	8...	12·20	11·69
Feb.	10...	12·11	12·06	June	10...	10·65	10·95		18...	12·56	12·01
	20...	12·14	12·17		20...	10·56	10·81		28...	12·94	12·35
Mar.	2...	12·13	12·22		30...	10·49	10·70	Nov.	7...	13·33	12·71
	12...	12·06	12·23	July	10...	10·47	10·61		17...	13·72	13 09
	22...	11·96	12·18		20...	10·50	10·57		27...	14·10	13·47
April	1...	11·82	12·10		30...	10·56	10·56	Dec.	7...	14·47	13·85
	11...	11·66	11·97	Aug.	9...	10·67	10·59		17...	14·81	14·22
	21...	11·48	11·72		19...	10·83	10·67		27...	15·12	14·56
May	1...	11·29	11·65		29...	11·03	10·79		37...	15·39	14·88
				Sept.	8...	11·27	10·96				

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Jan. 1	R. A. 9 h. sec.	R. A. 10 h. sec.	Aug. 12	Jan. 1	R. A. 9 h. sec.	R. A. 10 h. sec.	Aug. 12	Jan. 1	R. A. 9 h. sec.	R. A. 10 h. sec.	Aug. 12
1873	0·94	1·05	1891	1882	1·11	1·01	1900	1891	0·86	0.95	1909
1874	1·09	1·20	1892	1883	0·96	0·85	1901	1892	1·00	1·11	1910
1875	1·22	1·32	1893	1884	0·82	0·71	1902	1893	1·14	1·25	1911
1876	1·33	1·41	1894	1885	0·70	0·61	1903	1894	1·27	1·36	1912
1877	1·40	1·46	1895	1886	0·61	0·54	1904	1895	1·36	1·43	1913
1878	1·43	1·45	1896	1887	0·57	0·53	1905	1896	1·42	1·46	1914
1879	1·41	1·39	1897	1888	0·57	0·58	1906	1897	1·43	1·43	1915
1880	1·35	1·30	1898	1889	0·63	0·67	1907	1898	1·39	1·36	1916
1881	1·24	1·16	1899	1890	0·73	0·80	1908	1899	1·31	1·25	1917
1882	1·11	1·01	1900	1891	0·86	0·95	1909	1900	1·19	1·10	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. + ″
Ko. 1520. L.+·3 .	7·8	9 1 21·70	3·814	·031	51 8 51·4	14·35	·38
1 Rad. 2294. GK+·4	6·8	5 35·38	3·806	·031	50 52 43·2	14·62	·39
Ko. 102. L. . .	8	5 46·33	3·798	·031	51 8 58·6	14·61	·37
K. 104. L.+·3 .	8	5 50·08	3·764	·029	52 25 27·2	14·62	·37
K. 144. L.+·8 .	8	7 32·69	3·760	·030	52 26 29·2	14·72	·37
La. 18252. . .	7·5	9 8 16·33	3·813	·032	50 16 46·8	14·77	·38
2 Gree. 664. W.* .	4	9 33·20	3·741	·029	52 40 10·0	14·91	·36
1 Ra. 2306. G. .	8·1	10 39·62	3·813	·033	49 55 54·8	14·91	·37
K. 215. L. . .	7·8	10 46·67	3·766	·031	51 43 5·3	14·92	·36
1 Rad. 2311. G.* .	6·4	11 38·67	3·774	·032	51 17 2·1	14·97	·36
L. 18466. . .	7	9 15 8·29	3·723	·030	52 52 36·3	15·17	·35
K. 331. . .	8	16 2·78	3·737	·030	52 12 18·6	15·22	·35
Ko. 336. L. . .	8	16 12·70	3·717	·029	52 59 37·0	15·23	·35
La. 18500? . .	7·8	16 21·17	3·752	·031	51 34 16·8	15·24	·35
K. 488. . .	8	23 10·92	3·712	·031	52 11 16·5	15·62	·33
K. 503. L.+·5 .	8	9 24 1·62	3·694	·030	52 47 26·6	15·66	·33
4 Gre. 1169. A. .	6	24 17·02	3·692	·030	52 57 37·4	15·76	·33
K. 571. . .	8	26 50·65	3·706	·031	51 53 9·0	15·82	·33
1 Ra. 2379. G.* .	7·1	32 3·43	3·719	·032	50 28 42·3	16·11	·34
K. 693. L.+·7 .	7·3	32 34·52	3·678	·031	52 9 52·3	16·12	·31
K. 736. L. . .	7·5	9 33 52·72	3·671	·031	52 18 7·0	16·19	·31
K. 845. . .	8	40 0·14	3·637	·030	52 53 16·2	16·50	·29
K. 856. W. . .	6·3	40 18·94	3·640	·030	52 40 16·5	16·51	·29
K. 896. . .	7·2	42 3·09	3·630	·030	52 55 37·3	16·60	·29
4 Gre. 1208. A. .	7	43 10·90	3·647	·032	51 30 0·5	16·67	·29
K. 999. L.−1·0 .	8	9 46 48·87	3·645	·032	51 19 34·4	16·83	·28
K. 1051. L.−·3 .	8	48 56·69	3·654	·033	50 28 8·7	16·94	·28
K. 1118. . .	7·8	52 28·24	3·589	·030	52 53 12·8	17·10	·27
Ko. 1145. . .	8	53 44·12	3·641	·033	50 8 5·2	17·15	·27
1 Ra. 2429. G. .	8·4	53 48·29	3·612	·032	51 30 20·3	17·16	·27
L. 19581. . .	7·7	9 53 50·05	3·626	·033	50 46 54·7	17·16	·27
Ko. 1149. L.−1·3	7·7	53 53·69	3·641	·034	50 4 48·8	17·16	·27
1 Rad. 2434. G&W.	7	54 46·69	3·599	·032	51 22 21·0	17·36	·28
1 Ra. 2242. G. .	7·6	57 22·23	3·630	·032	49 53 17·1	17·31	·25
1 Ra. 2445. G. .	8·2	57 53·83	3·598	·032	51 22 4·2	17·34	·25

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Authority and Star's Name	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. + ″
1 Rad. 2446. G. .	8·2	9 58 16·63	3·602	·032	51 5 44·2	17·35	·25
Ko. 1258. L.+1·0	8	58 32·08	3·608	·033	50 44 27·2	17·37	·26

2 Gree. 664. Dup. **4**−3″−**6·7**−240°.
1 Ra. 2379. Dup. **7**−3″−**8·3**−275°.

1 Rad. 2311. Dup. **7**−2″−**7·2**−121°.

10
hours

TABLE II.

		10h.RA sec.	11h.RA sec.			10h.RA sec.	11h.RA sec.			10h.RA sec.	11h.RA sec.
Jan.	1...	11·13	10·74	May	1...	11·65	11·97	Sept.	8...	10 96	10·72
	11...	11·43	11·08		11...	11·47	11·82		18...	11·16	10 85
	21...	11·69	11·39		21...	11·29	11·64		28...	11.41	11·02
	31...	11·90	11·66		31...	11·11	11·46	Oct.	8...	11.69	11·23
Feb.	10...	12·06	11·89	June	10...	10·95	11·28		18...	12.01	11·48
	20...	12·17	12·07		20...	10·81	11·11		28...	12.35	11·77
Mar.	2...	12·22	12·20		30...	10·70	10·95	Nov.	7...	12·71	12·08
	12 ..	12·23	12·28	July	10...	10·61	10·82		17...	13·09	12·43
	22...	12·18	12·30		20...	10·57	10·71		27...	13·47	12·79
April	1...	12·10	12·28		30...	10·56	10·64	Dec.	7...	13·85	13·16
	11...	11·97	12·21	Aug.	9...	10·59	10·60		17...	14·22	13·53
	21...	11·72	12·11		19...	10·67	10·60		27...	14·56	13·90
May	1...	11·65	11·97		29...	10·79	10·64		37...	14·88	14·25
				Sept.	8...	10·96	10·72				

TABLE III.

Jan. 1	R. A. 10 h. sec.	R. A. 11 h. sec.	Aug. 12	Jan. 1	R. A. 10 h. sec.	R. A. 11 h. sec.	Aug. 12	Jan. 1	R. A. 10 h. sec.	R. A. 11 h. sec.	Aug. 12
1873	1·05	1·15	1891	1882	1·01	0·91	1900	1891	0·95	1·05	1909
1874	1·20	1·29	1892	1883	0·85	0·75	1901	1892	1·11	1·21	1910
1875	1·32	1·40	1893	1884	0·71	0·63	1902	1893	1·25	1·34	1911
1876	1·41	1·46	1894	1885	0·61	0·54	1903	1894	1·36	1·43	1912
1877	1·46	1·48	1895	1886	0·54	0·51	1904	1895	1·43	1·48	1913
1878	1·45	1·44	1896	1887	0·53	0·54	1905	1896	1·46	1·47	1914
1879	1·39	1·35	1897	1888	0·58	0·62	1906	1897	1·43	1·41	1915
1880	1·30	1·23	1898	1889	0·67	0·74	1907	1898	1·36	1·31	1916
1881	1·13	1·07	1899	1890	0·80	0·89	1908	1899	1·25	1·17	1917
1882	1·01	0·91	1900	1891	0·95	1·05	1909	1900	1·10	1·01	1918

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MEAN PLACES OF FIXED STARS FOR JANUARY 1, 1875.

AUTHORITY AND STAR'S NAME	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. + ″
1 Rad. 2451. KG.	7·8	10 0 12·59	3·597	·032	50 57 25·8	17·45	·26
K. 7. L.−·5 .	8	1 41·47	3·608	·034	50 0 49·7	17·50	·25
K. 17. . .	7·2	1 54·63	3·554	·030	52 55 5·8	17·51	·25
1 Rad. 2456. KG.	6·1	2 9·12	3·569	·031	51 58 58·0	17·54	·57
Ko. 96. L. .	8	4 36·55	3·597	·033	50 2 35·9	17·63	·24
6 B. 2117. .	8	10 5 41·52	3·566	·032	51 25 54·4	17·68	·23
K. 166. .	7·7	7 57·46	3·568	·032	50 51 29·0	17·77	·23
K. 197. L.+·5 .	7·7	9 21·19	3·542	·031	51 52 2·6	17·82	·23
K. 213. .	8	10 20·84	3·526	·030	52 33 41·4	17·86	·23
K. 265. L. .	8	12 59·15	3·546	·032	50 53 45·3	17·97	·22
K. 301. L. .	7	10 15 2·03	3·545	·033	50 19 54·8	18·05	·22
K. 302. L.+·6 .	8	15 2·58	3·546	·033	50 17 7·7	18·05	·22
K. 342. L. .	7	17 0·13	3·543	·033	50 5 51·4	18·14	·22
K. 356. L.−·6 .	8	18 5·26	3·490	·030	52 56 0·9	18·16	·21
La. 20226. .	8	18 33·09	3·536	·033	50 1 47·5	18·19	·22
4 Gre 1270=L. Mi β	4·5	10 18 57·33	3·481	·030	52 39 10·7	18·30	·21
4 Gr. 1275. 1 R. .	6	21 6.29	3·515	·032	50 26 9·2	18·28	·20
6 Bo. 2087. .	7·8	21 38·77	3·485	·030	52 19 31·0	18·30	·20
1 Rad. 2505. G. .	7·4	22 2·68	3·513	·033	50 20 15·9	18·31	·21
K. 491. .	7·4	24 8·83	3·507	·033	50 8 3·8	18·38	·20
K. 540. L. .	7·6	10 26 54·23	3·488	·032	50 49 21·9	18·48	·19
K. 563. .	8	28 11·35	3·462	·030	52 7 25·0	18·52	·19
6 B. 2368. K.+·4	8	28 57·18	3·480	·032	50 35 31·6	18·55	·18
K. 590. .	8	29 12·14	3·445	·029	52 53 36·7	18·55	·18
4 Gre. 1291. 1 R. .	6	30 14·94	3·441	·031	51 26 21·3	18·63	·18
K. 626. .	7·8	10 30 51·86	3·481	·033	49 56 40·0	18·61	·18
Ko. 628. L. .	7·8	30 55·84	3·459	·031	51 30 31·1	18·61	·18
Dor. 1228.* .	8	31 17·27	3·465	·031	50 56 44·6	18·62	·18
L. 20628. .	8	33 24·66	3·450	·031	51 18 6·8	18·69	·18
K. 693. L. .	8·9	33 33·93	3·429	·029	52 49 37·3	18·69	·17
K. 734. cL.+·7 .	8	10 35 24·39	3·435	·030	51 50 46·6	18·75	·17
Ko. 738. .	8	35 36·44	3·446	·031	50 59 12·9	18·76	·17
K. 745. L.+·4 .	8	36 10·97	3·440	·031	51 13 13·5	18·77	·17
Wa. 4498. K. .	7	39 32·25	3·417	·029	51 46 15·0	18·88	·16
Ko. 894. L. .	7·1	43 44·67	3·410	·030	50 59 59·4	19·00	·15
1 H. 3386. W. .	8	10 45 57·84	3·381	·028	52 34 27·5	19·06	·14
K. 1049. .	8	51 45·92	3·372	·030	51 3 27·2	19·20	·13
4 Gre. 1335. 1 R. .	5	52 2·67	3·374	·031	50 7 1·3	19·23	·13
K. 1075. La.+·6 .	7·8	52 54·80	3·364	·029	51 19 15·9	19·24	·13
K. 1077. L.+·7 .	6·8	53 0·77	3·349	·028	52 39 12·2	19·24	·13
6 Bo. 1246. .	8	10 53 23·84	3·351	·028	52 20 46·7	19·26	·12
K. 1096. L. .	7·7	53 54·55	3·340	·027	52 59 28·9	19·27	·13
1 Rad. 2614. G.+·6	7·9	55 6·16	3·363	·032	50 21 57·4	19·30	·13
1 Ra. 2615. KG. .	7·2	55 32·03	3·360	·032	50 27 30·3	19·31	·13
4 Gr. 1347. 1 R. .	6	55 46·22	3·346	·029	51 5 8·4	19·34	·12
4 Gr. 1348. 1 R. .	7·6	10 55 58·91	3·353	·029	51 4 48·7	19·32	·12
L. 21224. .	7·5	56 12·65	3·353	·030	50 54 47·0	19·33	·13
Ko. 1154. .	8	56 51·24	3·347	·029	51 3 8·9	19·34	·12
Ko. 1159. L.+·8 .	6·8	57 3·97	3·348	·029	50 55 48·6	19·34	·12
K. 1186. .	7·8	58 19·47	3·327	·027	52 35 13·3	19·37	·12

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Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. + ″
L. 21279. . .	8	10 58 40·24	3·324	·028	52 43 23·4	19·38	·12
K. 1196. W. .	7·8	58 53·99	3·325	·027	52 32 15·1	19·38	·12
L. 21311. . .	8	59 35·14	3·320	·027	52 52 4·1	19·40	·12

Dor. 1228. Dup. 8 − 5″ − 8·5 − 153° the 1st.

11 hours

TABLE II.

		11h.RA sec.	12h.RA sec.			11h.RA sec.	12h.RA sec.			11h.RA sec.	12h.RA sec.
Jan.	1...	10·74	10·30	May	1...	11·97	12·23	Sept.	8...	10·72	10·59
	11...	11·08	10·67		11...	11·82	12·11		18...	10·85	10·63
	21...	11·39	11·01		21...	11·64	11·96		28...	11·02	10·72
	31...	11·66	11·33		31...	11·46	11·79	Oct.	8...	11·23	10·85
Feb.	10...	11·89	11·61	June	10...	11·28	11·61		18...	11·48	11·02
	20...	12·07	11·87		20...	11·11	11·43		28...	11·77	11 24
Mar.	2...	12·20	12·07		30...	10·95	11·25	Nov.	7...	12·08	11·49
	12...	12·28	12·22	July	10...	10·82	11·08		17...	12·43	11·79
	22...	12·30	12·32		20...	10·71	10·93		27...	12·79	12·11
April	1...	12·28	12·36		30...	10·64	10·80	Dec.	7...	13·16	12·45
	11...	12·21	12·36	Aug.	9...	10·60	10·69		17...	13·53	12·81
	21...	12·11	12·31		19...	10·60	10·62		27...	13·90	13·18
May	1...	11·97	12·23		29...	10·64	10·58		37...	14·25	13·55
				Sept.	8...	10·72	10·59				

TABLE III.

Jan. 1	R. A. 11 h. sec.	R. A. 12 h. sec.	Aug. 12	Jan. 1	R. A. 11 h. sec.	R. A. 12 h. sec.	Aug. 12	Jan. 1	R. A. 11 h. sec.	R. A. 12 h. sec.	Aug. 12
1873	1·15	1·24	1891	1882	0 91	0·81	1900	1891	1·05	1·15	1909
1874	1·29	1·37	1892	1883	0·75	0·67	1901	1892	1·21	1·29	1910
1875	1·40	1·45	1893	1884	0·63	0·57	1902	1893	1·34	1·40	1911
1876	1·46	1·49	1894	1885	0·54	0·51	1903	1894	1·43	1·47	1912
1877	1·48	1·47	1895	1886	0·51	0·51	1904	1895	1·48	1·49	1913
1878	1·44	1·40	1896	1887	0·54	0·57	1905	1896	1·47	1·45	1914
1879	1·35	1·29	1897	1888	0·62	0·68	1906	1897	1·41	1·36	1915
1880	1·23	1·14	1898	1889	0·74	0 82	1907	1898	1·31	1·23	1916
1881	1·07	0·98	1899	1890	0 89	0·98	1908	1899	1 17	1·08	1917
1882	0·91	0·81	1900	1891	1·05	1·15	1909	1900	1·01	0·91	1918

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MEAN PLACES OF FIXED STARS FOR JANUARY 1, 1875.

AUTHORITY AND STAR'S NAME	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. + ″
Mad. 5084. K.−·4	7·3	11 3 34·54	3·306	·027	52 25 45·1	19·48	·11
1 Rad. 2643. K. .	7·7	6 22·30	3·299	·027	51 44 25·1	19·54	·09
3 Gre. 883. 1 R. .	5	10 28·67	3·282	·028	51 7 45·1	19·71	·09
Ko. 215. A. . .	7	11 2·52	3·282	·028	51 12 41·9	19·62	·09
K. 283. L.−4 .	8	14 59·88	3·268	·028	50 37 8·5	19·68	·08
1 Rad. 2675. K. .	6·9	11 15 17·02	3·356	·027	52 4 43·1	19·71	·09
K. 342. L. . .	8	18 3·58	3·248	·027	51 35 13·0	19·73	·07
1 Ra. 2685. G. .	7·3	19 9·89	3·243	·027	51 22 12·7	19·75	·07
1 Ra. 2688. K.−·3	7·5	19 59·49	3·249	·028	50 0 15·7	19·77	·07
4 Gre. 1381. 1 R..	5	20 28·13	3·241	·028	49 58 31·2	19·78	·07
K. 395. L.+1·5 .	8	11 20 42·86	3·231	·025	52 23 57·7	19·78	.07
1 Rad. 2696. W. .	7·1	21 40·61	3·232	·026	51 21 23·8	19·80	·08
K. 455. L.−·3 .	7·8	23 38·08	3·230	·027	50 23 1·1	19·82	·06
K. 468. L. . .	7·8	24 15·62	3·228	·027	50 26 42·1	19·83	·06
Ko. 470. L. . .	7	24 28·88	3·228	·027	49 59 15·4	19·83	·06
K. 477. L.−·3 .	8	11 24 37·04	3·226	·027	50 26 39·6	19·84	·06
K. 481. cL.+1·4 .	8	24 55·91	3·211	·025	52 32 37·1	19·84	·06
Was4823KL+1·3*	7	25 24·67	3·210	·025	52 29 30·9	19·85	·06
Ko. 583. L. . .	8	29 47·28	3·199	·026	50 33 10·8	19·89	·05
Ko. 596. L.+·4 .	8	30 12·33	3·196	·026	50 39 28·9	19·90	·05
K. 598. L. . .	7	11 30 17·51	3·199	·027	50 8 7·8	19·90	·05
K. 628. L.+·4 .	8	31 44·35	3·180	·024	52 49 51·6	19·92	·05
Dor. 1344. . .	7·5	35 48·63	3·171	·027	50 17 57·9	19·97	·06
K. 720. L. . .	7·5	35 51·62	3·170	·025	50 46 38·8	19·96	·04
K. 730. W. . .	8	36 21·25	3·165	·025	51 22 57·9	19·96	·04
K. 756. . .	8	11 37 29·23	3·165	·026	49 54 31·3	19·96	·03
K. 762. . .	8	37 41·26	3·164	·026	49 54 6·2	19·97	·03
K. 803. L. . .	8	40 13·91	3·143	·023	52 48 51·1	19·99	·03
K. 837. L.−·4 .	8	41 45·94	3·142	·025	50 30 45·7	20·00	·02
K. 853. W. . .	8	42 40·55	3·133	·023	52 28 7·4	20·00	·02
4 Gree. 1416. 1 R.*	6·7	11 43 50·53	3·473	·024	51 23 4·0	25·71	·02
K. 925. W. . .	6·5	46 50·17	3·112	·022	52 32 41·7	20·02	·01
K. 926. L. . .	6·5	46 56·62	3·116	·024	50 32 45·4	20·02	·01
4 G. 1430. K. .	8	50 21·89	3·100	·023	51 25 39·9	20·04	·01
K. 1035. W.. .	7·8	51 47·14	3·092	·022	52 34 28·9	20·04	·0
Wa. 5014. K−3 .	8	11 51 54·47	3·091	·022	52 34 13·5	20·05	·0
K. 1147. L.+·3 .	7·8	57 2·92	3·068	·023	50 38 43·9	20·05	−·01

Was. 4823. perhaps a P.M. of −·017 should have been adopted and reckoned from 1870.
4 Gre. 1416. = 1830. Groombridge P.M. +344ˢ and +5·70″.

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		12h.RA	13h.RA
		sec.	sec.
Jan.	1...	10·30	9·85
	11...	10·67	10·21
	21...	11·01	10·58
	31...	11·33	10·93
Feb.	10...	11·61	11·26
	20...	11·87	11·56
Mar.	2...	12·07	11·82
	12...	12·22	12·04
	22...	12·32	12·22
April	1...	12·36	12·34
	11...	12·36	12·40
	21...	12·31	12·43
May	1...	12·23	12·40

		12h.RA	13h.RA
		sec.	sec.
May	1...	12·23	12·40
	11...	12·11	12·33
	21...	11·96	12·23
	31...	11·79	12·09
June	10...	11·61	11·93
	20...	11·43	11·75
	30...	11·25	11·57
July	10...	11·08	11·38
	20...	10·93	11·20
	30...	10·80	11·02
Aug.	9...	10·69	10·87
	19...	10·62	10·73
	29...	10·58	10·63
Sept.	8...	10·59	10·55

		12h.RA	13h.RA
		sec.	sec.
Sept.	8...	10·59	10·55
	18...	10·63	10·52
	28...	10·72	10·52
Oct.	8...	10·85	10·57
	18...	11·02	10·65
	28...	11·24	10·80
Nov.	7...	11·49	10·98
	17...	11·79	11·21
	27...	12·11	11·47
Dec.	7...	12·45	11·77
	17...	12·81	12·10
	27...	13·18	12·45
	37...	13·55	12·82

TABLE III.

Jan. 1	R. A. 12 h. sec.	R. A. 13 h. sec.	Aug. 12	Jan. 1	R. A. 12 h. sec.	R. A. 13 h. sec.	Aug. 12	Jan. 1	R. A. 12 h. sec.	R. A. 13 h. sec.	Aug. 12
1873	1·24	1·31	1891	1882	0·81	0·73	1900	1891	1·15	1·23	1909
1874	1·37	1·42	1892	1883	0·67	0·61	1901	1892	1·29	1·36	1910
1875	1·45	1·47	1893	1884	0·57	0·53	1902	1893	1·40	1·44	1911
1876	1·49	1·48	1894	1885	0·51	0·51	1903	1894	1·47	1·48	1912
1877	1·47	1·43	1895	1886	0·51	0·54	1904	1895	1·49	1·46	1913
1878	1·40	1·33	1896	1887	0·57	0·63	1905	1896	1·45	1·40	1914
1879	1·29	1·20	1897	1888	0·68	0·76	1906	1897	1·36	1·28	1915
1880	1·14	1·04	1898	1889	0·82	0·92	1907	1898	1·23	1·14	1916
1881	0·98	0·88	1899	1890	0·98	1·08	1908	1899	1·08	0·98	1917
1882	0·81	0·73	1900	1891	1·15	1·23	1909	1900	0·91	0·82	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time — Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. − ″
1 Rad. 2801. 1 H.	7·4	12 1 9·46	3·048	·022	50 40 10·2	20·04	·02
6 Bo. 2505. . .	7·9	1 35·28	3·047	·022	49 52 14·2	20·05	·02
1 Ra. 2806. G. .	7·6	2 51·75	3·040	·021	50 10 30·5	20·04	·02
K. 152. L. . .	6·5	6 20·81	3·024	·022	49 57 41·4	20·04	·03
K. 160. L.−·4 .	7·8	7 4·29	3·021	·021	50 34 3·1	20·04	·03
K. 164. L.+1·0 .	7·2	12 7 12·76	3·020	·021	50 38 39·3	20·04	·03
2 Gr. 799. 1 R. .	7	11 59·60	2·999	·022	51 24 12·9	20·01	·02
1 Ra. 2843. G. .	7·8	12 50·28	2·994	·021	51 16 55·6	20·01	·04
K. 327. L. . .	8	14 37·97	2·982	·021	50 1 47·3	20·00	·04
K. 370. L.+1·5 .	7·5	16 42·10	2·975	·020	50 59 25·5	19·99	·04
L. 23238. . .	7·5	12 16 55·30	2·979	·019	52 5 10·6	19·98	·04
L. 23247. . .	8	17 16·17	2·977	·019	51 54 7·4	19·98	·04
K. 385. L. . .	7·8	17 14·36	2·973	·020	50 57 28·6	19·98	·05
1 Gr. 1009. 1 R. .	5·6	17 40·24	2·962	·022	50 17 15·2	20·02	·03
6 B. 2276. K. .	8	18 11·84	2·973	·018	52 11 38·9	19·97	·05
K. 418. L.+·4 .	7·1	12 18 59·62	2·973	·018	52 55 52·4	19·97	·05

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		h. m. s.	+ s.	− s.	° ′ ″	+ ′	− ″
Ko. 488. L.+·4 .	7	12 22 4·78	2·947	·020	50 3 20·5	19·95	·05
K. 505. . .	8	22 51·71	2·948	·019	51 9 38·9	19·93	·06
1 Rad. 2880. G. .	6·4	25 21·89	2·936	·018	51 14 25·8	19·92	·05
K. 600. L. . .	7·6	26 51·46	2·937	·017	52 58 54·7	19·89	·06
2 Ra. 1212. K. .	7·3	27 1·62	2·936	·017	52 53 8·4	19·89	·06
6 B. 2299. K. .	7·9	12 27 10·58	2·936	·017	52 58 14·3	19·89	·07
L. 23610. . .	7·3	29 32·13	2·914	·018	50 37 24·0	19·87	·06
Ko. 671. L.+·6 .	7·5	30 43·30	2·905	·018	49 59 45·6	19·85	·07
K. 693. L.+1·2* .	8	31 49·55	2·913	·017	52 18 48·5	19·84	·07
Ko. 727. L.−·5 .	7·4	33 19·33	2·899	·017	50 55 20·4	19·82	·07
Arm. 2733. P.+·4	7·5	12 34 11·12	2·903	·016	52 37 15·0	19·81	·06
2 Rad. 1227. 1 R.	6·2	37 00·00	2·842	·018	50 2 28·5	19·60	·08
L. 23805. . .	7·8	37 38·17	2·877	·017	50 57 16·5	19·75	·08
Wa. 5345. K.+3 .	7·8	40 25·47	2·879	·015	52 58 31·0	19·71	·09
K. 876. L.−·5 .	7·5	41 40·28	2·858	·016	50 57 1·2	19·69	·09
1 Gr. 1028. 1 R. .	6	12 42 9·19	2·862	·018	51 48 9·5	19·68	·08
K. 947. L.−·4 .	9	45 33·38	2·845	·015	51 20 47·3	19·63	·09
K. 958. L.−·4 .	8	46 5·25	2·850	·015	52 19 57·0	19·61	·10
4 Gre. 1532. 1 R. .	7	48 3·28	2·809	·015	51 0 36·4	19·58	·10
4Gree 1533=C.V.α	3	48 4·53	2·807	·015	51 0 21·9	19·52	·10
Do. 1484. K.+·3*	8	12 50 35·03	2·818	·015	51 1 35·3	19·53	·10
K. 1078. . .	8	52 52·25	2·802	·015	50 23 58·5	19·48	·11
La. 24246? . .	7·5	53 22·84	2·807	·015	51 16 42·6	19·47	·10
K. 1103. W. .	7	54 23·93	2·808	·014	51 58 45·7	19·45	·11
L. 24272. . .	7·7	54 25·09	2·795	·015	50 30 17·5	19·44	·11
K. 1104. L. . .	7·7	12 54 25·56	2·796	·015	50 26 43·2	19·45	·11
1 Ra. 2956. K. .	7·6	56 45·22	2·779	·015	50 0 19·8	19·40	·10
K. 1145. L.+·5 .	7·6	57 0·42	2·799	·013	52 3 14·0	19·39	·11
K. 1165. . .	8	58 0·93	2·783	·014	50 55 31·4	19·37	·11
1 Rad. 2964. G. .	8·1	59 18·53	2·788	·013	52 3 50·1	19·32	·12
K. 1204. L.+1·0 .	8	12 59 59·87	2·788	·013	52 21 15·5	19·32	·12

K. 693. perhaps a P.M. of −·020 should have been adopted and reckoned from 1825.
Do. 1484. Dup. **8**−36″−**8·5**−83° the 1st. Dif. in time 3·02″.

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		13h.RA sec.	14h.RA sec.			13h.RA sec.	14h.RA sec.			13h.RA sec.	14h.RA sec.
Jan.	1...	9·85	9·40	May	1...	12·40	12·48	Sept.	8...	10·55	10·63
	11...	10·21	9·75		11...	12·33	12·47		18...	10·52	10·52
	21...	10·58	10·12		21...	12·23	12·42		28...	10·52	10·45
	31...	10·93	10·48		31...	12·09	12·33	Oct.	8...	10·57	10·42
Feb.	10...	11·26	10·84	June	10...	11·93	12·21		18...	10·66	10·43
	20...	11·56	11·18		20...	11·75	12·05		28...	10·80	10·48
Mar.	2...	11·82	11·49		30...	11·57	11·88	Nov.	7...	10·98	10·58
	12...	12·04	11·77	July	10...	11·38	11·69		17...	11·21	10·73
	22...	12·22	12·01		20...	11·20	11·49		27...	11·47	10·93
April	1...	12·34	12·20		30...	11·02	11·30	Dec.	7...	11·77	11·17
	11...	12·40	12·34	Aug.	9...	10·87	11·10		17...	12·10	11·45
	21...	12·43	12·44		19...	10·73	10·93		27...	12·45	11·76
May	1...	12·40	12·48		29...	10·63	10·73		37...	12·82	12·10
				Sept.	8...	10·55	10·63				

TABLE III.

Jan. 1	R. A. 13 h. sec.	R. A. 14 h. sec.	Aug. 12	Jan. 1	R. A. 13 h. sec.	R. A. 14 h. sec.	Aug. 12	Jan. 1	R. A. 13 h. sec.	R. A. 14 h. sec.	Aug. 12
1873	1·31	1·37	1891	1882	0·73	0·67	1900	1891	1·23	1·30	1909
1874	1·42	1·44	1892	1883	0·61	0·58	1901	1892	1·36	1·40	1910
1875	1·47	1·46	1893	1884	0·53	0·53	1902	1893	1·44	1·45	1911
1876	1·48	1·43	1894	1885	0·51	0·55	1903	1894	1·48	1·45	1912
1877	1·43	1·36	1895	1886	0·54	0·61	1904	1895	1·46	1·41	1913
1878	1·33	1·24	1896	1887	0·63	0·72	1905	1896	1·40	1·32	1914
1879	1·20	1·10	1897	1888	0·76	0·86	1906	1897	1·28	1·19	1915
1880	1·04	0·95	1898	1889	0·92	1·02	1907	1898	1·14	1·04	1916
1881	0·88	0·80	1899	1890	1·08	1·17	1908	1899	0·98	0·89	1917
1882	0·73	0·67	1900	1891	1·23	1·30	1909	1900	0·82	0·74	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time — Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. − ″
Dor. 1500. L.+·5	8	13 0 20·91	2·769	·014	50 35 20·5	19·31	·12
K. 11. L.+1·0 .	7·5	0 45·06	2·784	·013	52 6 29·4	19·30	·12
1 Gr. 1051. 1 R. .	6	1 44·75	2·775	·015	51 54 36·9	19·28	·11
4 Gr. 1552. 1 R. .	5	1 48·30	2·764	·013	50 47 58·7	19·27	·12
K. 39. L.+·5 .	7·5	2 7·31	2·778	·013	52 10 46·2	19·27	·12
4 Gr. 1553. 1 R. .	7	13 2 8·14	2·752	·013	50 36 35·7	19·26	·12
4 Gre. 1554. 1 R. .	5	2 10·17	2·756	·013	50 50 10·8	19·23	·12
Dor. 1506. K.−·3	7·8	4 9·47	2·771	·012	52 25 32·0	19·22	·12
K. 106. L.−·8 .	6·8	5 8·55	2·754	·013	51 3 14·5	19·20	·12
Wa. 5490. L.−·9 .	6·5	5 41·16	2·765	·012	52 26 56·2	19·18	·12
K. 152. L.+·7 .	8	13 7 36·93	2·759	·012	52 44 7·5	19·14	·13
K. 196. 6 B‡ .	8	9 33·88	2·749	·011	52 31 25·0	19·08	·13
K. 249. . .	7	11 54·65	2·745	·011	52 58 10·5	19·01	·14
La. 24758. . .	7·5	12 6·84	2·720	·011	50 58 27·9	19·01	·13
La. 24760. . .	7·2	12 17·56	2·722	·012	50 10 45·3	19·01	·13
K. 261. . .	7	13 12 44·78	2·737	·011	52 39 54·0	18·99	·14

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		h. m. s.		+ s.	− s.	° ′ ″	+ ″	− ″
K. 266. . .	7	13 12 58·00		2·726	·011	51 46 45·2	18·98	·14
1 Ra. 2999. 1 H. .	7·2	13 20·30		2·720	·012	51 29 13·6	18·97	·15
K. 286.. . .	6·9	13 44·75		2·707	·012	50 27 48·9	18·97	·14
1 Ra. 3004. G. .	7·7	15 38·62		2·690	·012	49 55 4·2	18·91	·13
1 Rad. 3007. K. .	6·4	16 3·13		2·718	·012	52 18 44·0	18·89	·14
K. 351. . .	7·6	13 17 9·92		2·709	·011	51 54 46·9	18·86	·14
6 B. 2446. K.+·4	8	17 56·22		2·701	·011	51 30 25·7	18·84	·15
K. 487. L.−1·6 .	7	23 28·48		2·695	·010	52 52 26·3	18·67	·15
K. 492. L.−·4 .	7·5	23 49·03		2·686	·010	52 14 36·5	18·66	·15
Dor. 1531. K.* .	6·5	24 33·65		2·687	·009	52 32 16·2	18·63	·15
L. 25065. . .	7·6	13 24 47·36		2·650	·011	50 3 52·3	18·63	·15
L. 25091. . .	7·9	25 21·29		2·647	·011	50 0 14·6	18·61	·15
1 Ra. 3048. G. .	6·9	26 37·80		2·648	·012	50 34 13·5	18·56	·16
3 Gre. 1085, 7 B. .	5	27 0·35		2·676	·009	52 10 36·4	18·57	·15
Ma. 7201. P.−·5 .	8	27 31·00		2·680	·009	52 58 31·8	18·54	·16
K. 582. . .	7·7	13 27 48·47		2·661	·009	51 39 26·6	18·54	·16
1 Rad. 3060. G. .	7·8	30 22·69		2·606	·012	50 10 47·6	18·56	·17
Ko. 647. L.−2·50	8	31 0·90		2·637	·009	50 59 1·9	18·42	·16
Ko. 774. 6 B.‡ .	7·4	35 32·48		2·618	·009	51 6 53·2	18·26	·17
Ko. 837. L. . .	7·3	38 21·12		2·619	·008	51 50 43·0	18·15	·17
1 Ra. 3090. G. .	6·3	13 38 39·86		2·601	·009	50 52 9·0	18·14	·17
1 Ra. 3092. G. .	6	39 21·99		2·597	·009	50 49 52·1	18·12	·16
Ko. 860. . .	8	39 31·01		2·615	·008	51 45 29·8	18·11	·17
Ko. 866. W. .	6·8	39 50·62		2·607	·008	51 28 54·2	18·10	·17
K. 919. . .	7·8	41 49·99		2·609	·007	52 5 28·8	18·03	·17
Ko. 929. W. .	6·5	13 42 3·35		2·618	·007	52 44 42·0	18·02	·18
Ko. 976. W. .	8	43 48·11		2·595	·007	51 39 41·5	17·94	·18
K. 1070. W. .	7	46 57·99		2·592	·007	52 18 45·9	17·82	·18
1 Ra. 3014. K. .	7·1	48 18·50		2·543	·008	49 55 22·7	17·76	·17
K. 1193. . .	6·5	52 49·71		2·532	·007	50 21 51·3	17·58	·19
Ko. 1281. L.−1·2	7·8	13 56 34·90		2·548	·006	52 1 39·1	17·42	·19
K. 1283. . .	8	56 35·86		2·551	·006	52 12 5·9	17·42	·19
Dor. 1580. K. .	7	58 53·54		2·519	·006	50 59 7·0	17·32	·19

Dor. 1531. Dup. **7**−4″−**7·9**−134° the 1st.

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		14h.RA	15h.RA			14h.RA	15h.RA			14h.RA	15h.RA
		sec.	sec.			sec.	sec.			sec.	sec.
Jan.	1...	9·40	9·00	May	1...	12·48	12·46	Sept.	8...	10·63	10·80
	11...	9·75	9·31		11...	12·47	12·52		18...	10·52	10·64
	21...	10·12	9·66		21...	12·42	12·53		28...	10·45	10·50
	31...	10·48	10·02		31...	12·33	12·50	Oct.	8...	10·42	10·39
Feb.	10...	10·84	10·39	June	10...	12·21	12·43		18...	10·43	10·32
	20...	11·18	10·75		20...	12·05	12·32		28...	10·48	10·30
Mar.	2...	11·49	11·10		30...	11·88	12·17	Nov.	7...	10·58	10·32
	12...	11·77	11·42	July	10...	11·69	12·00		17...	10·73	10·39
	22...	12·01	11·72		20...	11·49	11·81		27...	10·93	10·51
April	1...	12·20	11·97		30...	11·30	11·61	Dec.	7...	11·17	10·68
	11...	12·34	12·18	Aug.	9...	11·10	11·40		17...	11·45	10·90
	21...	12·44	12·34		19...	10·93	11·19		27...	11·76	11·15
May	1...	12·48	12·46		29...	10·77	10·99		37...	12·10	11 46
				Sept.	8...	10·63	10·80				

TABLE III.

	R. A.	R. A.			R. A.	R. A.			R. A.	R. A.	
Jan. 1	14 h.	15 h.	Aug. 12	Jan. 1	14 h.	15 h.	Aug. 12	Jan. 1	14 h.	15 h.	Aug. 12
	sec.	sec.			sec.	sec.			sec.	sec.	
1873	1·37	1·39	1891	1882	0·67	0·63	1900	1891	1·30	1·35	1909
1874	1·44	1·43	1892	1883	0·58	0·57	1901	1892	1·40	1·41	1910
1875	1·46	1·42	1893	1884	0·53	0·57	1902	1893	1·45	1·43	1911
1876	1·43	1·36	1894	1885	0·55	0·61	1903	1894	1·45	1·40	1912
1877	1·36	1·26	1895	1886	0·61	0·70	1904	1895	1·41	1·33	1913
1878	1·24	1·14	1896	1887	0·72	0·83	1905	1896	1·32	1·22	1914
1879	1·10	0·99	1897	1888	0·86	0·97	1906	1897	1·19	1·08	1915
1880	0·95	0·85	1898	1889	1·02	1·12	1907	1898	1·04	0 94	1916
1881	0·80	0·72	1899	1890	1·17	1·25	1908	1899	0·89	0·80	1917
1882	0·67	0·63	1900	1891	1·30	1·35	1909	1900	0·74	0·68	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. − s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. − ″
K. 21. L.—·9 .	8	14 0 35·06	2·545	·005	52 39 22·5	17·24	·20
K. 62. W. . .	7·5	2 10·54	2·528	·005	52 4 46·9	17·17	·20
Ko. 77. . .	7·5	2 56·14	2·512	·005	51 24 36·7	17·14	·20
6 B. 2521. . .	8	3 0·31	2·521	·005	51 55 1·2	17·13	·20
K. 117. . .	7·8	4 26·99	2·488	·005	50 34 51·2	17·06	·20
L. 26108. . .	7·9	14 6 12·97	2·506	·005	51 50 17·5	16·98	·20
1 Ra. 3167. G. .	7·2	7 5·33	2·467	·007	50 8 23·9	16·94	·20
K. 199. L.—·9 .	8	8 13·58	2·509	·004	52 22 18·9	16·89	·21
K. 219. L.—·7 .	7·8	8 51·66	2·505	·004	52 17 23·4	16·87	·21
K. 256. L.—·6 .	7·5	10 27·88	2·488	·004	51 45 50·4	16·78	·21
1 Ra. 3179. K. .	8·1	14 10 41·86	2·460	·004	50 27 15·1	16·77	·20
1 Rad. 3183. G. .	7·1	11 27·73	2·461	·004	50 39 24·7	16·73	·21
K. 284. L.—·8 .	7·5	11 56·87	2·483	·004	51 48 44·4	16·71	·21
4 Gre. 1655. 1 R..	6	12 19·72	2·458	·004	50 37 50·3	16·69	·21
K. 328. L.—·4 .	7·8	13 38·26	2·448	·004	50 26 31·9	16·63	·21
K. 327. . .	8	14 13 39·66	2·481	·004	52 1 29·9	16·63	·21

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		h. m. s.		+ s.	− s.	° ′ ″	+ ″	− ″
1 Rad. 3196. G. .	7·4	14 15 57·75		2·477	·004	52 13 35·8	16·52	·20
K. 383. L. . .	7·3	16 5·72		2·430	·004	50 5 46·8	16·51	·21
4 Gre. 1658. 1 R..	6·7	18 2·12		2·444	·003	51 2 28·0	16·41	·21
6 B. 2557. . .	7·8	20 41·05		2·453	·003	51 53 1·2	16·27	·22
L. 26514. . .	7·5	22 20·13		2·417	·003	50 34 47·9	16·19	·21
K. 516. cL. . .	7·5	14 22 39·98		2·455	·003	52 17 56·4	16·17	·22
2 Gree. 903. Boo. γ	3·2	24 40·65		2·414	·005	51 8 38·6	15·91	·21
1 Rad. 3219. G. .	6·3	25 51·70		2·447	·002	52 29 14·7	16·00	·22
K. 599. L. . .	8	26 35·64		2·399	·003	50 30 39·6	15·96	·22
K. 612. L.−·5 .	7·5	27 5·92		2·419	·002	51 26 24·5	15·94	·22
Arm. 3086. P. .	6	14 27 9·50		2·450	·002	52 49 24·2	15·93	·22
K. 680. L. . .	8	30 48·81		2·435	·002	52 43 52·6	15·75	·23
L. 26744. . .	8	31 55·53		2·436	·002	52 56 57·7	15·68	·23
1 Rad. 3242. G. .	7·6	32 36·40		2·396	·002	51 21 5·9	15·63	·24
1 Ra. 3244. G. .	7·4	33 36·32		2·392	·002	51 19 13·7	15·58	·23
Ko. 781. L. . .	7·6	14 34 54·06		2·357	·002	50 3 40·0	15·52	·23
K. 788. W. . .	6·8	35 12·12		2·419	·002	52 42 34·6	15·50	·23
6 B. 2573. W. .	8	38 35·88		2·405	·001	52 34 48·0	15·30	·24
1 Rad. 3263. G. .	8·1	40 42·43		2·378	·001	51 48 26·5	15·18	·24
1 Rad. 3265. 7 B.	6·2	41 47·47		2·349	·001	51 40 21·2	15·00	·24
Ko. 949. . .	7·9	14 42 18·93		2·328	·001	50 0 59·2	15·10	·23
4 Gre. 1685. 1 R..	6	43 8·39		2·360	·001	52 12 50·6	14·95	·24
1 Ra. 3276. G. .	7·5	44 20·97		2·329	·001	50 22 51·4	14·97	·24
Ko. 999. . .	7·6	44 27·33		2·347	·001	50 4 43·4	14·97	·24
W. 6142. K.+·4 .	8	48 24·24		2·345	·001	51 31 9·3	14·73	·24
K. 1161. . .	8	14 51 23·98		2·325	·0	50 58 49·7	14·56	·24
3 Gre. 1190. 1. R.	5	52 22·85		2·296	·0	50 14 16·3	14·43	·24
L. 27436. . .	7·5	54 46·74		2·299	·0	50 34 42·7	14·35	·24
K. 1285. L.+·4. .	7	57 28·08		2·300	·0	50 54 37·2	14·18	·24

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	15h.RA	16h.RA		15h.RA	16h.RA		15h.RA	16h.RA
	sec.	sec.		sec.	sec.		sec.	sec.
Jan. 1...	9·00	8·66	May 1...	12·46	12·34	Sept. 8...	10·80	11·07
11...	9·31	8·93	11...	12·52	12·47	18...	10·64	10·86
21...	9·66	9·24	21...	12·53	12·55	28...	10·50	10 67
31...	10·02	9·57	31...	12·50	12·59	Oct. 8...	10·39	10·50
Feb. 10...	10·39	9·92	June 10...	12·43	12·57	18...	10·32	10·37
20...	10·75	10·29	20...	12·32	12·51	28...	10·30	10 27
Mar. 2...	11·10	10·66	30...	12·17	12·41	Nov. 7...	10·32	10·22
12...	11·42	11·02	July 10...	12·00	12·28	17...	10·39	10·21
22...	11·72	11·35	20...	11·81	12·12	27...	10·51	10·25
April 1...	11·97	11 66	30...	11·61	11·93	Dec. 7...	10·68	10·34
11...	12·18	11·93	Aug. 9...	11·40	11·72	17...	10·90	10·49
21...	12·34	12·16	19...	11·19	11·50	27...	11·16	10·69
May 1...	12·46	12·34	29...	10·99	11·28	37...	11·46	10·93
			Sept. 8...	10·80	11·07			

TABLE III.

	R. A.	R. A.			R. A.	R. A.			R. A.	R. A.	
Jan. 1	15 h.	16 h.	Aug. 12	Jan. 1	15 h.	16 h.	Aug. 12	Jan. 1	15 h.	16 h.	Aug. 12
	sec.	sec.			sec.	sec.			sec.	sec.	
1873	1·39	1·39	1891	1882	0·63	0·61	1900	1891	1·35	1·37	1909
1874	1·43	1·39	1892	1883	0·57	0·60	1901	1892	1·41	1·40	1910
1875	1·42	1·34	1893	1884	0·57	0·63	1902	1893	1·43	1·38	1911
1876	1·36	1·26	1894	1885	0·61	0·70	1903	1894	1·40	1·32	1912
1877	1·26	1·15	1895	1886	0·70	0·81	1904	1895	1·33	1·22	1913
1878	1·14	1·02	1896	1887	0·83	0·94	1905	1896	1·22	1·10	1914
1879	0·99	0·89	1897	1888	0·97	1·08	1906	1897	1·08	0·97	1915
1880	0·85	0·77	1898	1889	1·12	1·21	1907	1898	0·94	0·84	1916
1881	0·72	0·67	1899	1890	1·25	1·31	1908	1899	0·80	0·73	1917
1882	0·63	0·61	1900	1891	1·35	1·37	1909	1900	0·68	0·64	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time — Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. − ″
K. 54. L.−·9 .	8	15 1 38·89	2·320	·0	52 12 33·4	13·92	·25
1Ham.4966.K.+·6	8	2 8·92	2·260	·001	50 5 32·1	13·90	·24
Dor. 1692. K.+·3	7	2 42·38	2·271	·001	50 32 53·3	13·85	·25
K. 87. . . .	7·9	2 50·13	2·306	·001	51 49 54·6	13·85	·25
K. 119. L.+1·0 .	8	3 58·22	2·268	·001	50 34 52·9	13·78	·25
1 Gr. 1226. 1 H. .	7·5	15 4 40·17	2·326	·001	52 46 29·9	13·73	·25
Σ Dor. 1698. L. .	7·2	4 43·67	2·273	·001	50 51 23·1	13·72	·25
Dor. 1698. L.* .	7	4 46·18	2·273	·001	50 51 30·4	13·72	·25
K. 151. L. . .	7·8	5 10·70	2·263	·001	50 32 35·5	13·70	·25
K. 165. . .	8	6 0·69	2·269	·001	50 51 55·7	13·65	·25
4 Gre. 1716. 1 R. .	6	15 6 21·11	2·279	·001	51 15 58·0	13·62	·25
1 Ra. 3346. G.* .	6·9	7 43·04	2·273	·001	51 14 11·7	13·54	·25
1 G. 1233. 1 H. .	8	7 43·78	2·315	·001	52 42 20·8	13·54	·25
4 G. 1721. W. .	7	9 6·28	2·304	·001	52 28 12·1	13·44	·25
cL. 27929. . .	8	9 15·48	2·255	·001	50 44 53·8	13·44	·25
1 Ha. 5027. L.+·7	8	15 11 28·48	2·223	·001	49 55 59·7	13·29	·25

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		h. m. s.		+ s.	+ s.	° ′ ″	+ ″	− ″
1 Ha. 5034. W. .	8	15 12 4·06		2·275	·001	51 45 30·7	13·25	·26
1 Ra. 3366. 1 H. .	8	15 21·43		2·214	·001	50 2 20·2	13·04	·24
1 Rad. 3369. .	5·5	15 29·64		2·212	·001	49 58 17·0	13·03	·24
1 Ham. 5072. W. .	7·5	17 7·50		2·249	·002	51 21 54·3	12·91	·26
4 Gree. 1737. Boo. μ	4·3	17 15·40		2·259	·001	52 11 0·4	12·81	·26
1 Ra. 3378. 1 H. .	7	15 17 17·21		2·272	·001	52 12 48·3	12·90	·26
1 Gr. 1259. 1 R. .	6·7	21 21·05		2·220	·002	50 50 36·1	12·63	·25
1 Ha. 5119. K. .	6·5	23 12·20		2·272	·002	52 46 6·7	12·50	·27
K. 571. W. . .	7·8	23 33·39		2·231	·002	51 24 31·7	12·48	·26
K. 579. L.−1·1 .	6·5	24 5·06		2·275	·002	52 57 25·2	12·45	·27
3 Gr. 1240. 1 R. C. B. μ	5	15 28 7·29		2·193	·002	50 34 25·7	12·15	·26
Ko. 705. L. . .	6·5	28 39·23		2·210	·002	51 12 41·4	12·13	·26
Ko. 721. L.+·3 .	8	29 12·81		2·239	·002	52 12 37·6	12·09	·27
6 B. 2683. W. .	7·8	30 58·38		2·215	·002	51 33 45·4	11·96	·27
3 Gr. 1244. 2 R. .	6	32 6·71		2·253	·002	52 27 22·8	11·88	·27
3 Gr. 1245. D. C. B. ζ	4	15 32 7·14		2·253	·002	52 57 25·8	11·88	·27
Ko. 862. W. .	6·6	33 13·76		2·224	·002	52 4 44·5	11·80	·27
Wa. 6476. K.+·3 .	7	33 16·19		2·239	·002	52 34 43·0	11·79	·27
La. 28660. . .	7·5	33 37·48		2·186	·002	50 52 39·3	11·78	·26
Ko. 881. L.−·8 .	7·7	33 52·50		2·199	·002	51 19 4·2	11·76	·27
Ko. 892. L.+·6 .	7	15 34 17·87		2·189	·002	51 2 25·9	11·73	·27
6 B. 2669. . .	7·9	34 35·08		2·235	·003	52 33 5·5	11·71	·27
K. 968. L.+1·1 .	7·9	36 58·02		2·150	·003	50 1 53·2	11·54	·26
Wa. 6500. K. .	7·5	37 17·33		2·213	·003	52 4 15·4	11·51	·27
K. 1025. L. . .	8	39 21·74		2·167	·003	50 45 45·9	11·37	·27
1 Ha. 5176. W. .	8	15 40 12·39		2·217	·003	52 25 50·1	11·30	·27
L. 28894. . .	8	42 17·85		2·132	·003	49 56 38·1	11·15	·26
Wa. 6546. K.+·8 .	8	43 23·70		2·188	·003	51 47 10·4	11·07	·27
1 Ham. 5206. W. .	7	43 41·44		2·197	·003	52 4 13·7	11·05	·27
4 G. 1796. 1 R. C. B. λ	6·5	48 38·98		2·176	·003	51 41 27·6	10·58	·27
Wa. 6590. K.+·4 .	8	15 48 45·70		2·211	·003	52 54 45·0	10·68	·28
Ka. 1284. L. .	7	49 4·67		2·122	·003	50 12 30·5	10·66	·27
1 Rad. 3476. G. .	6·3	50 29·84		2·110	·003	49 56 48·7	10·54	·28
Wa. 6607. K.+·3 .	8	51 8·95		2·191	·003	52 25 42·0	10·50	·28
K. 1341. . .	6·8	51 15·61		2·171	·003	51 48 52·9	10·50	·27
Wa. 6611. K.+·5 .	6·8	15 51 48·14		2·197	·003	52 42 2·9	10·45	·28
1 Rad. 3482. K.−·3	6·7	53 52·10		2·119	·003	50 28 16·6	10·29	·26
1 Rad. 3495. G. K.	7	58 0·84		2·068	·003	50 30 19·0	9·98	·26

Dor. 1698. Dup. **7**−30″−**7·2**−284° the 2nd. Dif. in time 2·53 s.
1 Ra. 3346. Dup. **6·1**−2″−**8·4**−261°.

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		16h.RA	17h.RA
		sec.	sec.
Jan.	1...	8·66	8·42
	11...	8·93	8·63
	21...	9·24	8·88
	31...	9·57	9·17
Feb.	10...	9·92	9·50
	20...	10·29	9·85
Mar.	2...	10·66	10·21
	12...	11·02	10·58
	22...	11·35	10·94
April	1...	11·66	11·29
	11...	11·93	11·60
	21...	12·16	11·89
May	1...	12·34	12·13

		16h.RA	17h.RA
		sec.	sec.
May	1...	12·34	12·13
	11...	12·47	12·33
	21...	12·55	12·48
	31...	12·59	12·58
June	10...	12·57	12·64
	20...	12·51	12·64
	30...	12·41	12·60
July	10...	12·28	12·52
	20...	12·12	12·39
	30...	11·93	12·24
Aug.	9...	11·72	12·06
	19...	11·50	11·85
	29...	11·28	11·63
Sept.	8...	11·07	11·40

		16h.RA	17h.RA
		sec.	sec.
Sept.	8...	11·07	11·40
	18...	10·86	11·17
	28...	10·67	10·95
Oct.	8...	10·50	10·74
	18...	10·37	10·55
	28...	10·27	10·40
Nov.	7...	10·22	10·27
	17...	10·21	10·19
	27...	10·25	10·16
Dec.	7...	10·34	10·17
	17...	10·49	10·25
	27...	10·69	10·37
	37...	10·93	10·55

TABLE III.

Jan. 1	R. A. 16 h. sec.	R. A. 17 h. sec.	Aug. 12	Jan. 1	R. A. 16 h. sec.	R. A. 17 h. sec.	Aug. 12	Jan. 1	R. A. 16 h. sec.	R. A. 17 h. sec.	Aug. 12
1873	1·39	1·37	1891	1882	0·61	0·62	1900	1891	1·37	1·37	1909
1874	1·39	1·33	1892	1883	0·60	0·65	1901	1892	1·40	1·36	1910
1875	1·34	1·25	1893	1884	0·63	0·71	1902	1893	1·38	1·30	1911
1876	1·26	1·15	1894	1885	0·70	0·82	1903	1894	1·32	1·21	1912
1877	1·15	1·03	1895	1886	0·81	0·94	1904	1895	1·22	1·10	1913
1878	1·02	0·90	1896	1887	0·94	1·07	1905	1896	1·10	0·98	1914
1879	0·89	0·79	1897	1888	1·08	1·19	1906	1897	0·97	0·86	1915
1880	0·77	0·70	1898	1889	1·21	1·28	1907	1898	0·84	0·75	1916
1881	0·67	0·64	1899	1890	1·31	1·35	1908	1899	0·73	0·67	1917
1882	0·61	0·62	1900	1891	1·37	1·37	1909	1900	0·64	0·63	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var + ″	Sec. Var. − ″
Ko. 45. L.+·4 .	7·8	16 0 17·64	2·116	·003	50 50 10·0	9·81	·27
Ko. 50. L. . .	7·8	0 21·12	2·106	·003	50 30 46·6	9·80	·27
1 Ra. 3516. K. .	6·4	5 4·59	2·098	·003	50 37 18·5	9·44	·27
D. 1797. K. .	7	5 51·60	2·086	·003	50 20 0·2	9·38	·27
1 Ra. 3520. G. .	7	6 7·32	2·129	·003	51 36 35·6	9·36	·28
K. 337. L.−·3 .	8	16 9 8·79	2·113	·003	51 18 45·7	9·12	·28
K. 358. L. . .	7·8	9 39·49	2·103	·004	51 2 49·4	9·08	·28
K. 376. W. . .	8	10 24·08	2·161	·003	52 46 20·7	9·02	·29
La. 29773. . .	7·8	11 11·38	2·111	·003	51 25 10·0	8·96	·28
K. 408. cL. . .	7	11 54·30	2·128	·003	51 55 47·6	8·90	·28
1 Radc. 3533. K..	5·6	16 12 58·69	2·058	·003	49 59 27·7	8·82	·27
K. 447. . . .	7	13 8·49	2·152	·003	52 43 29·1	8·81	·29
K. 570. L. . .	7·8	16 55·36	2·088	·004	51 4 12·0	8·51	·28
Dor. 1817.W.−·5*	7·8	17 2·56	2·143	·003	52 40 31·3	8·50	·29
K. 580. L.−·4 .	7·5	17 13·64	2·094	·004	51 14 4·3	8·48	·28
4 Gr. 1863. A. .	6·5	16 18 16·32	2·129	·003	52 19 12·8	8·40	·29

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		h. m. s.		+ s.	+ s.	° ′ ″	+ ″	− ″
1 Ra. 3546. K. .	7·7	16 18 20·07		2·110	.004	51 48 11·8	8·40	·26
L. 30027. . .	7·5	20 0·38		2·075	·004	50 52 24·7	8·26	·28
6 B. ‡ 2787. K.+·3	7·8	23 27·19		2·087	·004	51 23 2·2	7·99	·28
K. 768. L. . .	8	23 36·45		2·114	·004	52 12 6·2	7·98	·29
Dor. 1833. W. .	7	23 51·23		2·096	·004	51 40 3·0	7·95	·28
1 Rad. 3574. G. .	6·8	16 26 37·93		2·089	·004	51 39 0·7	7·72	·30
L. 30202. . .	8	26 8·05		2·092	·004	51 39 52·2	7·77	·28
K. 933. . .	8	28 6·71		2·126	·004	52 43 28·4	7·61	·29
K. 938. . .	8	28 15·71		2·131	·004	52 49 57·3	7·60	·29
L. 30236. . .	8	27 30·47		2·092	·004	51 44 32·4	7·66	·28
L. 30268. . .	8	16 28 22·75		2·098	·004	51 58 7·5	7·59	·29
K. 997. . .	8	29 53·58		2·058	·004	50 53 51·1	7·46	·28
K. 1015. W. .	7·7	30 19·73		2·105	·004	52 15 30·1	7·43	·29
1 Rad. 3585. G. .	6·9	31 6·99		2·029	·004	50 10 14·2	7·37	·27
L. 30364. . .	8	31 22·87		2·114	·004	52 32 55·6	7·34	·29
Do. 1851. . .	8	16 31 32·56		2·074	·004	51 25 30·8	7·33	·29
K. 1075. . .	7·2	32 6·02		2·073	·004	51 24 32·6	7·29	·28
6 B. 2813. W. .	8	32 41·81		2·077	·004	51 33 20·7	7·23	·29
L. 30419. W. .	7·5	33 7·89		2·105	·004	52 23 58·1	7·20	·29
4 Gree. 1893. 1 R.H. η	3	35 53·06		2·048	·004	50 50 19·9	7·04	·28
L. 30581. . .	8	16 38 32·76		2·024	·004	50 23 17·5	6·75	·28
K. 1341. L. . .	7	40 31·65		2·087	·004	52 13 2·1	6·59	·29
K. 1346. L. . .	7·5	40 37·30		2·019	·004	50 19 52·7	6·58	·28
6 Bon. 2804. .	8	41 27·62		2·105	·004	52 45 9·3	6·51	·29
L. 30745. W. .	8	44 17·21		2·068	·004	51 50 8·1	6·28	·29
Ko. 1457. L. .	8	16 44 31·66		2·048	·004	51 16 18·8	6·26	·29
L. 30851. . .	8	47 53·18		2·086	·004	52 28 37·2	5·97	·30
K. 1596. . .	8	49 16·82		2·064	·004	51 53 12·6	5·86	·29
L. 30935. . .	7·5	50 41·50		2·055	·004	51 42 24·8	5·74	·29
K. 1656. L.—·4 .	7·8	51 26·30		1·995	·004	50 5 36·1	5·68	·28
K. 1657. . .	8	16 52 33·32		2·059	·004	51 50 15·6	5·67	·29
6 B. 2826. . .	8	52 37·21		2·095	·003	52 53 29·3	5·58	·30
K. 1693. cL. . .	8	52 44·65		2·062	·004	51 57 45·1	5·57	·29
1 Rad. 3637. G. .	7·1	53 6·83		2·015	·004	50 43 6·5	5·53	·29
K. 1715. L. . .	7·3	53 31·55		2·022	·004	50 54 21·7	5·51	·29
Ko. 1729. L. .	8	16 53 56·91		1·998	·004	50 16 26·9	5·47	·28
K. 1757. L.+·5 .	8	54 53·04		2·091	·003	52 50 44·7	5·39	·30
K. 1764. . .	8	54 54·63		1·991	·004	50 6 10·7	5·39	·28

Dor. 1817. Dup. **7·8 − 9″ − 8 − 347°** the 2nd.

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		17h.RA	18h.RA
		sec.	sec.
Jan.	1...	8·42	8·29
	11...	8·63	8·42
	21...	8·88	8·61
	31...	9·17	8·85
Feb.	10...	9·50	9·13
	20...	9·85	9·45
Mar.	2...	10·21	9·79
	12...	10·58	10·15
	22...	10·94	10·52
April	1...	11·29	10 88
	11...	11·60	11·22
	21...	11·89	11·55
May	1...	12·13	11·85

		17h.RA	18h.RA
		sec.	sec.
May	1...	12·13	11·85
	11...	12·33	12·11
	21...	12·48	12·32
	31...	12·58	12·49
June	10...	12·64	12·61
	20...	12·64	12·69
	30...	12·60	12·71
July	10...	12·52	12·69
	20...	12·39	12·63
	30...	12·24	12·52
Aug.	9...	12·06	12·38
	19...	11·85	12·20
	29...	11·63	12·01
Sept.	8...	11·40	11·79

		17h.RA	18h.RA
		sec.	sec.
Sept.	8...	11·40	11·79
	18...	11·17	11·56
	28...	10·95	11·33
Oct.	8...	10·74	11·09
	18...	10·55	10·87
	28...	10·40	10·67
Nov.	7...	10·27	10·49
	17...	10·19	10·35
	27...	10·16	10·25
Dec.	7...	10·17	10·20
	17...	10·25	10·19
	27...	10·37	10·24
	37...	10·55	10·35

TABLE III.

Jan. 1	R. A. 17 h. sec.	R. A. 18 h. sec.	Aug. 12
1873	1·37	1·32	1891
1874	1·33	1·24	1892
1875	1·25	1·14	1893
1876	1·15	1·02	1894
1877	1·03	0·90	1895
1878	0·90	0·79	1896
1879	0·79	0·71	1897
1880	0·70	0·65	1898
1881	0·64	0·63	1899
1882	0·62	0·66	1900

Jan. 1	R. A. 17 h. sec.	R. A. 18 h. sec.	Aug. 12
1882	0·62	0·66	1900
1883	0·65	0·72	1901
1884	0·71	0·82	1902
1885	0·82	0·94	1903
1886	0·94	1·07	1904
1887	1·07	1·18	1905
1888	1·19	1·28	1906
1889	1·28	1·34	1907
1890	1·35	1·37	1908
1891	1·37	1·35	1909

Jan. 1	R. A. 17 h. sec.	R. A. 18 h. sec.	Aug. 12
1891	1·37	1·35	1909
1892	1·36	1·29	1910
1893	1·30	1·20	1911
1894	1·21	1·09	1912
1895	1·10	0·97	1913
1896	0·98	0·86	1914
1897	0·86	0·76	1915
1898	0·75	0·68	1916
1899	0·67	0·64	1917
1900	0·63	0·64	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. + ″	Sec. Var. − ″
L. 31239. . .	8	17 0 0·77	2·030	·004	51 20 13·5	4·95	·29
K. 71. L.+5 .	8	1 14·18	2·055	·003	52 3 37·3	4·86	·29
K. 107. W. . .	7	2 32·44	2·035	·003	51 33 2·5	4·74	·29
K. 124. . .	7·7	3 9·33	2·018	·004	51 6 31·7	4·69	·29
Do. 1913. K. .	7·5	4 36·67	1·997	·004	50 35 19·6	4·56	·29
L. 31368. . .	8	17 5 31·13	2·071	·003	52 37 55·9	4·48	·30
1 Ra. 3682. G. .	6·9	6 26·84	2·004	·003	50 52 3·7	4·40	·29
Ko. 329. L. . .	7	9 56·17	1·985	·004	50 24 9·1	4·11	·29
4 Gr. 1939. 2 R. .	5	10 32·30	2·062	·003	52 34 35·2	3·98	·30
1 Rad. 3693. G. .	6	11 22·12	2·007	·003	51 3 36·2	3·98	·29
K. 379. . .	8	17 11 26·41	2·048	·003	52 6 17·0	3·98	·29
L. 31608. . .	8	12 34·00	2·072	·003	52 49 38·6	3·88	·30
K. 425. . .	8	12 43·75	1·988	·003	50 34 57·3	3·87	·29
K. 452. . .	8	13 27·92	2·005	·003	51 2 10·6	3·81	·29
K. 461. . .	8	13 45·62	1·996	·003	50 46 44·3	3·78	·29
K. 498. . .	8	17 15 7·98	2·040	·003	51 59 32·1	3·67	·29

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		h. m. s.		+ s.	+ s.	° ′ ″	+ ″	− ″
2 Gre. 1123. 2 R.H. ρ*	4	17 16 31·82		2·062	·003	52 44 15·3	3·52	·30
1 Rad. 3705. G. .	6·8	16 59·60		2·012	·003	51 18 14·0	3·49	·31
K. 558. . .	8	16 59·85		1·968	·003	50 8 29·5	3·50	·28
Arm. 3573. W. .	7	17 0·91		2·073	·003	52 57 46·9	3·50	·30
4 Gr. 1449. 2 R. .	6·7	17 17·00		2·070	·003	52 56 9·0	3·47	·30
Ko. 573. L. .	8	17 17 22·35		1·997	·003	50 54 56·9	3·47	·29
1 Ra. 3706. K. .	8·1	17 36·73		1·988	·003	50 42 5·7	3·45	·28
1 Ra. 3707. K. .	7·1	17 39·15		1·987	·003	50 40 39·2	3·44	·28
K. 586. . .	8	17 48·87		2·070	·003	52 52 49·2	3·43	·30
Arm. 3575. W. .	8	18 0·57		2·066	·003	52 42 36·8	3·41	·29
K. 600. . .	8	17 18 13·54		1·969	·003	50 12 6·1	3·40	·29
Wa. 7256. . .	7·3	18 22·95		2·064	·003	52 10 8·5	3·38	·30
K. 680. L.+·4 .	8	20 48·90		2·033	·003	51 57 24·1	3·18	·29
1 Radc. 3717. G. .	6·6	23 38·29		1·996	·003	51 1 24·2	2·92	·29
1 Ha. 5926. W. .	6·5	28 32·45		2·053	·003	52 37 5·2	2·49	·30
Ko. 974. . .	7·8	17 28 47·04		2·026	·003	51 54 36·7	2·49	·29
Ko. 1064. . .	8	31 1·90		1·960	·003	50 12 8·6	2·29	·29
K. 1160. . .	7·7	33 7·74		1·958	·003	50 10 59·6	2·10	·29
K. 1206. . .	7·3	34 19·90		2·030	·003	52 4 33·3	1·99	·30
6 Bo. 2984. 1 H. .	7	35 7·47		2·022	·003	51 52 22·6	1·92	·29
K. 1253. . .	7·5	17 35 53·39		2·041	·003	52 22 21·6	1·86	·30
K. 1300. . .	7·5	37 44·65		2·029	·003	52 4 46·7	1·70	·29
1 Ham. 6017. L.+·7	6	37 45·67		2·012	·003	51 37 31·4	1·70	·29
1 Rad. 3754. G. .	8·1	38 6·30		1·985	·003	50 57 21·4	1·67	·28
1 Rad. 3758. G. .	6·5	38 50·06		1·990	·003	51 4 4·9	1·59	·30
1 Rad. 3759. G. .	6·7	17 38 56·85		1·972	·003	50 37 44·0	1·58	·30
K. 1354. . .	8	39 23·64		2·001	·003	51 23 5·6	1·54	·29
1 Ham. 6049. W. .	7	41 5·19		2·015	·003	51 43 17·3	1·40	·29
K. 1418. L.−·3 .	7	41 44·88		2·057	·003	52 53 38·7	1·34	·30
Ko. 1445. cL. .	6·8	42 39·51		1·961	·003	50 21 15·5	1·27	·29
Ko. 1468. L.+·3 .	7·7	17 43 32·70		1·964	·003	50 26 42·1	1·19	·29
Ko. 1474. L.+·3 .	7·7	43 38·19		1·964	·003	50 24 38·8	1·18	·29
Do. 2010. W. .	8	43 45·50		2·034	·003	52 15 25·8	1·17	·29
Wa. 7496. L.+·7 .	7·5	44 1·21		2·006	·003	51 31 26·9	1·15	·29
K. 1527. L.+·9 .	8	45 9·95		1·997	·003	51 17 15·7	1·05	·29
Ko. 1538. L.+·4 .	7	17 45 37·50		1·992	·003	50 9 6·3	1·01	·29
1 H. 6114. . .	7·5	46 4·76		1·958	·003	50 17 0·8	0·96	·29
K. 1596. . .	8	47 23·81		2·004	·003	51 31 20·4	0·85	·29
K. 1619. . .	8	48 16·91		1·999	·003	51 21 25·9	0·78	·29
2 Gr. 1161. D. He. θ	4	49 2·23		2·046	·002	52 43 54·8	0·69	·30
Ko. 1653. L.−·3 .	7·6	17 49 8·02		1·967	·003	50 32 30·5	0·70	·29
L. 33010. . .	7·5	50 45·17		2·019	·003	51 54 2·9	0·56	·29
K. 1756. L. . .	8	52 37·23		2·012	·002	51 42 44·6	0·40	·29
K. 1804. . .	8	54 4·52		1·982	·002	50 58 10·6	0·27	·29
K. 1884. . .	8	56 22·43		2·019	·002	51 55 14·3	0·07	·29
Ko. 1913. L.−·5 .	7	17 57 3·29		1·966	·002	50 31 33·7	0·00	·29
K. 1922. L. . .	7·8	57 37·86		2·027	·002	52 10 26·7	−·05	·30
1 Rad. 3839. G.−·3	7·9	58 43·87		1·984	·002	51 0 45·8	−·15	·29
K. 9. L.−·6 .	7·5	58 57·57		2·030	·002	52 14 20·9	−·17	·30
6 B. 3077. . .	8	59 7·56		2·007	·002	51 36 41·0	−·18	·29
K. 33. L. . .	8	17 59 39·67		2·029	·002	52 12 57·4	−·23	·30

2 Gre. 1123. Dup. **4**−4″−**5·1**−307° the mean.

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		18h.RA	19h.RA			18h.RA	19h.RA			18h.RA	19h.RA
		sec.	sec.			sec.	sec.			sec.	sec.
Jan.	1...	8·29	8·27	May	1...	11·85	11·51	Sept.	8...	11·79	12·19
	11...	8·42	8·33		11...	12·11	11·81		18...	11·56	11 99
	21...	8·61	8·45		21...	12·32	12·09		28...	11·33	11·76
	31...	8·85	8·62		31...	12·49	12·31	Oct.	8...	11·09	11·53
Feb.	10...	9·13	8·84	June	10...	12·61	12·51		18...	10·87	11·29
	20...	9·45	9·11		20...	12·69	12·65		28...	10·67	11·07
Mar.	2...	9·79	9·41		30...	12·71	12·74	Nov.	7...	10·49	10·86
	12...	10·15	9·76	July	10...	12·69	12·79		17...	10·35	10·67
	22...	10·52	10·10		20...	12·63	12·79		27...	10·25	10·51
April	1...	10·88	10·46		30...	12·52	12·75	Dec.	7...	10·20	10·39
	11...	11·22	10·82	Aug.	9...	12·38	12·66		17...	10·19	10·32
	21...	11·55	11·17		19...	12·20	12·54		27...	10·24	10·30
May	1...	11·85	11·51		29...	12·01	12·38		37...	10·35	10·33
				Sept.	8...	11·79	12·19				

TABLE III.

	R. A.	R. A.			R. A.	R. A.			R. A.	R. A.	
Jan. 1	18 h.	19 h.	Aug. 12	Jan. 1	18 h.	19 h.	Aug. 12	Jan. 1	18 h.	19 h.	Aug. 12
	sec.	sec.			sec.	sec.			sec.	sec.	
1873	1·32	1·25	1891	1882	0·66	0·72	1900	1891	1·35	1·30	1909
1874	1·24	1·14	1892	1883	0·72	0·82	1901	1892	1·29	1·21	1910
1875	1·14	1·02	1893	1884	0·82	0·94	1902	1893	1·20	1·09	1911
1876	1·02	0·89	1894	1885	0·94	1·07	1903	1894	1·09	0·97	1912
1877	0·90	0·78	1895	1886	1·07	1·19	1904	1895	0·97	0·85	1913
1878	0·79	0·70	1896	1887	1·18	1·29	1905	1896	0·86	0·75	1914
1879	0·71	0·64	1897	1888	1·28	1·35	1906	1897	0·76	0·67	1915
1880	0·65	0·63	1898	1889	1·34	1·38	1907	1898	0·68	0·63	1916
1881	0·63	0·65	1899	1890	1·37	1·36	1908	1899	0·64	0·63	1917
1882	0·66	0·72	1900	1891	1·35	1·30	1909	1900	0·64	0·67	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. − ″
L. 33423. . .	8	18 0 58·20	1·949	·002	50 5 48·0	0·35	·29
1 Rad. 3850. K.G.	8·1	1 36·67	1·982	·002	50 57 21·5	0·39	·28
Wa. 7691. cL. + 2·2	6·7	2 31·48	2·005	·002	51 32 43·1	0·48	·29
L. 33484. . .	7·4	2 49·71	1·951	·002	50 8 28·0	0·51	·29
1 Rad. 3855. G. .	8	3 10·85	1·982	·002	50 56 56·8	0·54	·29
1 Rad. 3856. G. .	7·6	18 3 47·19	1·986	·002	51 3 56·5	0·58	·28
1 Rad 3859 GK − ·3	7·1	4 6·39	1·981	·002	50 55 38·8	0·61	·28
L. 33558. . .	7·7	4 34·34	2·028	·002	52 8 22·1	0·66	·30
K. 220. L. − ·5 .	8	5 12·79	2·036	·002	52 22 17·8	0·72	·30
K. 230. . .	8	5 45·79	2·013	·002	51 43 32·1	0·76	·29
1 Rad. 3867. G. .	6·3	18 5 56·29	1·994	·002	51 15 37·0	0·78	·29
K. 280. W. . .	7·5	7 39·40	2·046	·002	52 37 36·9	0·93	·30
K. 287. L. − ·3 .	7·7	7 48·21	1·959	·002	50 18 22·0	0·94	·29
K. 318. L. − ·3 .	7·8	8 57·27	1·972	·002	50 39 27·6	1·04	·29
L. 33857. . .	8	11 49·07	2·039	·002	52 23 28·9	1·30	·30
K. 401. . .	7·5	18 11 51·38	1·978	·002	50 47 3·3	1·29	·29

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		h. m. s.		+ s.	+ s.	° ′ ″	− ″	− ″
6 B. 3383. K. .	7·8	18 12 37·68		1·985	·002	50 57 41·8	1·37	·29
6 B. 3385. . .	7·9	12 43·15		1·966	·002	50 27 26·6	1·37	·29
6 B. 3391. . .	8	13 26·40		1·955	·002	50 10 42·2	1·44	·29
K. 504. . .	8	15 10·78		2·048	·002	52 38 21·4	1·59	·30
Ko. 513. L.—·4 .	7·3	15 31·52		1·980	·002	50 48 14·4	1·61	·29
Ko. 521. . .	7·8	18 15 55·13		1·970	·002	50 32 49·1	1·65	·29
L. 34049. . .	7·7	16 10·96		2·017	·002	51 45 38·7	1·67	·29
L. 34064. . .	7	16 31·38		2·015	·002	51 43 16·7	1·70	·29
K. 555. . .	8	17 0·14		2·039	·002	52 21 44·2	1·75	·30
4Gr.2034. 1 R.Ly.μ	5·6	17 6·52		1·969	·002	50 33 36·1	1·75	·29
K. 593. L.+·4 .	7	18 18 10·05		2·014	·002	51 37 49·0	1·84	·29
1 Ra. 3920. . .	8·1	18 29·32		1·986	·002	50 56 57·7	1·87	·28
K. 626. L.—1·1 .	7·9	19 34·22		2·050	·002	52 38 3·6	1·97	·30
K. 680. . .	7·7	21 23·10		2·003	002	51 18 33·9	2·13	·29
Ko. 678. L.—·3 .	7·5	21 23·11		2·058	·002	52 49 45·7	2·13	·30
K. 728. L.—·6 .	7·6	18 22 52·40		2·060	·002	52 51 50·2	2·26	·30
K. 785. . .	8	24 20·53		1·960	·002	50 11 45·9	2·39	·28
1 Ra. 3959. A. .	7·7	25 30·65		2·001	·002	51 13 41·6	2·48	·28
cL. 34412. W. .	7·8	25 33·84		2·054	·002	52 39 40·1	2·49	·30
1 Rad. 3960. A. .	7·3	25 38·87		2·002	·002	51 15 23·7	2·49	·27
K. 878. W. . .	7·3	18 26 54·20		2·018	·002	51 39 44·0	2·61	·29
K. 901. . .	8	27 52·95		2·058	·002	52 44 8·2	2·69	·30
K. 904. L.—·8 .	7	27 53·23		1·978	·002	50 34 10·7	2·69	·29
6 B. 3172. . .	8	27 59·07		2·031	·002	51 59 7·3	2·70	·29
1 Gr. 1630. 1 R. .	7	28 8·38		2·001	·002	51 12 21·0	2·72	·29
6 B. 3173. . .	8	18 28 23·07		2·048	·002	52 26 3·2	2·74	·30
L. 34581. W. .	7	28 54·74		2·035	·002	52 4 6·5	2·78	·29
2 Radc. 1770. 1 H.	7·9	29 33·39		2·018	·002	51 35 3·8	2·84	·29
4 Gree. 2050. Ly. α	1	29 40·06		2·025	·001	51 19 53·7	3·13	·29
K. 969. . .	8	29 41·67		2·056	·002	52 41 38·8	2·86	·30
K. 985. W. . .	7	18 30 12·02		2·045	·002	52 19 37·8	2·90	·30
Ko. 1001. L. .	7·8	30 38·17		2·058	·002	52 40 26·5	2·94	·30
1 Ra. 3999. G. .	6·2	30 56·35		1·975	·002	50 26 27·5	2·97	·29
K. 1024. L.—·6 .	7·8	31 19·40		1·984	·002	50 40 44·7	2·98	·29
K. 1042. L.—·5 .	7·7	32 12·44		2·056	·002	52 35 44·6	3·07	·30
La. 34698. . .	7	18 32 24·24		2·039	·002	52 7 22·2	3·09	·29
4 Gre. 2052. 1 R. .	6	32 55·16		2·029	·002	51 44 52·7	3·13	·29
K. 1150. . .	8	35 28·15		2·061	·002	52 40 46·5	3·35	·30
1 Rad. 4031. G. .	6·5	36 3·26		1·993	·001	50 49 27·5	3·41	·29
1 Rad. 4036. G. .	6·4	36 48·15		2·023	·001	51 35 38·7	3·46	·28
3Gre.1504–5. Ly.ϵ*	4	18 37 8·39		1·978	·001	50 27 33·1	3·54	·28
3Gre.1506–7. L.ϵ5*	4	37 10·70		1·981	·001	50 31 1·2	3·59	·28
K. 1209. . .	7·7	37 20·61		2·002	·001	51 3 27·1	3·51	·29
4Gre.2059. 2R.Ly.ζ	4·5	37 24·49		2·060	·001	52 31 28·4	3·54	·29
4 Gre. 2060. 2 R. .	5·6	37 26·32		2·059	·001	52 32 5·9	3·54	·29
1 Ra. 4047. G. .	7·5	18 37 52·53		2·031	·001	51 48 45·1	3·55	·27
1 Ra. 4059. G. .	8·1	39 15·81		2·031	·001	51 46 46·7	3·67	·28
Ko. 1306. . .	8	40 14·45		2·073	·001	52 53 39·5	3·77	·30
Ko. 1328. . .	7·8	41 0·11		2·052	·001	52 19 4·1	3·82	·29
1 Rad. 4083. G. .	7·6	42 18·76		2·032	·001	51 42 58·2	3·95	·29
1 Rad 4093 GK 1 H	7·2	18 43 24·72		1·998	·001	50 48 22·4	4·03	·27
1 Ra. 4098. G.L.*	7·1	44 3·08		2·056	·001	51 31 25·5	4·09	·27
1 Rad. 4099. G. .	7·3	44 11·25		2·000	·001	50 49 43·2	4·10	·28

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Authority and Star's Name	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. − ″
La. 35238. . .	7	18 44 37·15	2·067	·001	52 37 57·6	3·14	·29
Ko. 1471. L.−·3 .	7·9	45 33·97	2·076	·001	52 50 12·5	4·22	·29
6 B. 3336. . .	7·8	45 55·88	2·017	·001	51 13 21·1	4·26	·29
6 B. 3273. . .	7·5	46 16·47	2·052	·001	52 9 59·4	4·28	·29
Ko. 1503. . .	7·7	46 32·66	2·073	·001	52 46 40·5	4·30	·29
La. 35460. . .	7·6	18 49 46·92	2·026	·001	51 21 55·0	4·59	·29
6 B. 3373. K. .	6·2	50 39·49	2·047	·001	51 54 3·6	4·66	·29
K. 1652. L.−·5 .	8	50 54·51	2·044	·001	51 48 47·0	4·67	·29
1 Rad. 4140. G. .	7·4	51 3·83	1·996	·001	50 31 34·9	4·69	·28
1Rad4141GM−·3	7·3	51 11·73	1·991	·001	50 23 27·7	4·70	·28
1 Rad. 4145. G. .	6·4	18 51 53·95	2·013	·001	50 57 16·2	4·76	·28
La. 35600. 1 H.M.	7·7	52 57·49	2·059	·001	52 10 42·8	4·85	·29
1 Ra. 4152. G. .	7·6	53 7·14	2·011	·001	50 50 23·9	4·86	·27
1 Ra. 4157. G. .	7·7	53 18·31	1·991	·001	50 19 50·8	4·88	·28
1 Ra. 4158. G. .	7·4	53 19·90	1·990	·001	50 18 34·3	4·88	·27
K. 1785. M.+·3 .	7·8	18 54 44·22	2·068	·001	52 22 8·1	5·00	·29
K. 1805. . .	8	55 16·77	2·056	·001	52 2 42·3	5·04	·29
1 Rad. 4173. G. .	7·9	55 49·62	1·990	·001	50 13 45·8	5·11	·29
1 Ra. 4176. G. .	8	56 22·46	1·992	·001	50 16 24·7	5·14	·27
1 Ra. 4180. G.K. .	7·7	56 46·14	1·985	·001	50 4 6·7	5·18	·29
K. 1869. L.−·4 .	7·9	18 56 58·54	2·060	·001	52 4 50·8	5·19	·29
Ko. 1878. M. .	7·7	57 26·60	2·038	·001	51 26 43·3	5·24	·29
Dor. 2225. K. .	8	57 49·75	1·987	·001	50 3 46·3	5·27	·28
Ko. 9. W. . .	7	58 58·99	2·089	·001	52 48 18·7	5·35	·29

3 Gre. 1504–5. Dup. **4·6**−3″−**6·3**−26° the mean.
3 Gre. 1506–7. **4·9**−2·6″−**5·2**−155° the mean.
1 R. 4098. a P.M. of +030s. adopted.

19 hours

TABLE II.

		19h.RA sec.	20h.RA sec.			19h.RA sec.	20h.RA sec.			19h.RA sec.	20h.RA sec.
Jan.	1...	8·27	8·37	May	1...	11·51	11·13	Sept.	8...	12·19	12·60
	11...	8·33	8·36		11...	11·81	11·47		18...	11·99	12·43
	21...	8·45	8·41		21...	12·09	11·78		28...	11·76	12·23
	31...	8·62	8·50		31...	12·31	12·07	Oct.	8...	11·53	12·02
Feb.	10...	8·84	8·66	June	10...	12·51	12·32		18...	11·29	11 80
	20...	9·11	8·86		20...	12·65	12·53		28...	11·07	11·57
Mar.	2...	9·41	9·11		30...	12·74	12·69	Nov.	7...	10·86	11·34
	12...	9·76	9·40	July	10...	12·79	12·81		17...	10·67	11·13
	22...	10·10	9·72		20...	12·79	12·88		27...	10·51	10·93
April	1...	10·46	10·07		30...	12·75	12·91	Dec.	7...	10·39	10·76
	11...	10·82	10·42	Aug.	9...	12·66	12·89		17...	10·32	10·63
	21...	11·17	10·78		19...	12·54	12·83		27...	10·30	10·55
May	1...	11·51	11·13		29...	12·38	12·73		37...	10·33	10·51
				Sept.	8...	12·19	12·60				

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Jan. 1	R. A. 19 h. sec.	R. A. 20 h. sec.	Aug. 12	Jan. 1	R. A. 19 h. sec.	R. A. 20 h. sec.	Aug. 12	Jan. 1	R. A. 19 h. sec.	R. A. 20 h. sec.	Aug. 12
1873	1·25	1·16	1891	1882	0·72	0·80	1900	1891	1·30	1·23	1909
1874	1·14	1·03	1892	1883	0·82	0·93	1901	1892	1·21	1·11	1910
1875	1·02	0·89	1893	1884	0·94	1·06	1902	1893	1·09	0 97	1911
1876	0·89	0·77	1894	1885	1·07	1·19	1903	1894	0·97	0·85	1912
1877	0·78	0·68	1895	1886	1·19	1·30	1904	1895	0·85	0·73	1913
1878	0·70	0·62	1896	1887	1·29	1·37	1905	1896	0·75	0·65	1914
1879	0·64	0·60	1897	1888	1·35	1·40	1906	1897	0·67	0·61	1915
1880	0·63	0·63	1898	1889	1·38	1·39	1907	1898	0·63	0·61	1916
1881	0·65	0·70	1899	1890	1·36	1·33	1908	1899	0·63	0·65	1917
1882	0·72	0·80	1900	1891	1·30	1·23	1909	1900	0·67	0·73	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. − ″
1 Rad. 4202. A. .	7·3	19 0 25·00	2·036	·001	51 16 7·6	5·48	·27
1 Rad. 4203. A. .	7	0 51·56	2·027	·001	51 2 35·4	5·52	·28
Ma. 8813. D. .	7	1 6·27	2·074	·001	52 17 17·7	5·55	·29
Wa. 8176. L. + 3 .	7·2	1 13·29	2·051	·001	51 41 25·4	5·56	·29
L. 36040. . .	8	2 2·07	2·045	·001	51 29 18·8	5·62	·28
Arm. 3968. K. .	6·5	19 2 17·84	2·079	·001	52 24 24·7	5·64	·29
Ko. 146. L. + ·4 .	8	2 43·90	2·069	·001	52 7 17·6	5·68	·29
K. 157. L. − ·3 .	8	3 1·75	2·053	·001	51 38 34·8	5·70	·28
1 Ra. 4212. . .	8·1	3 23·08	2·040	·001	51 17 58·2	5·74	·29
1 Rad. 4213. G. .	7·9	3 27·90	2·031	·001	51 2 6·5	5·75	·29
1 H. 7193. . .	7·8	19 3 37·81	2·005	·001	50 19 54·9	5·76	·28
K. 183. . .	8	3 38·34	2·033	·001	51 2 7·8	5·75	·28
1 Ra. 4215–6. 1 H.*	8	3 46·70	2·045	·001	51 25 18·3	5·77	·29
L. 36157. . .	7·2	4 28·45	2·003	·001	50 15 12·4	5·83	·28
L. 36158. . .	8	4 30·23	2·000	·001	50 11 10·4	5·83	·28
Arm. 3979. K. .	7·5	19 4 38·56	2·023	·001	50 47 19·1	5·85	·29
Ar. 3981. Ko. + ·4	8	5 21·29	2·021	·001	50 42 49·–	5·90	·28
Dor. 2257. W. .	8	6 5·38	2·040	·001	51 10 32·0	5·96	·28
3 Gre. 1552. Ly. η*	4·5	6 21·89	2·036	·001	51 4 5·0	6·01	·28
1 Ha. 7257. L. .	8	6 34·79	2·043	·001	51 14 16·8	6·01	·28
6 B. 3384. . .	7·9	19 6 50·72	2·091	·001	52 34 27·7	6·03	·29
K. 285. . .	8	7 4·16	2·017	·001	50 33 49·8	6·04	·28
L. 36324. . .	7·3	7 55·79	2·054	·001	51 30 42·7	6·12	·28
1 Ra. 4241. K. .	8	7 57·57	2·002	·001	50 6 17·4	6·12	·28
Ko. 321. . .	7·5	8 17·35	2·103	·001	52 55 15·6	6·14	·29
6 B. 3507. . .	7·5	19 8 20·48	2·067	·001	51 50 56·0	6·15	·28
3 Gr. 1560. A. Ly. θ	4·5	8 52·97	2·071	·001	52 5 18·2	6·13	·29
K. 354. L. + ·4 .	8	9 16·80	2·050	·001	51 20 30·9	6·22	·28
L. 36378. . .	8	9 22·57	2·041	·001	51 5 19·3	6·24	·28
6 B. 3486. . .	8	9 38·38	2·109	·001	52 59 51·9	6·26	·29
6 B. 3487. . .	8	19 9 42·23	2·109	·001	52 58 57·0	6·27	·29
K. 371. W. . .	6·7	9 43·58	2·046	·001	51 11 48·5	6·27	·28
K. 375. L. . .	6·7	9 54·97	2·043	·001	51 6 8·8	6·28	·28
L. 36411. . .	8	10 0·80	2·074	·001	52 36 46·5	6·29	·29
K. 378. . .	8	10 4·56	2·039	·001	51 58 51·9	6·29	·28

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Authority and Star's Name	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. − ″
6 B. 3410. K. −·3 .	7·5	19 11 17·52	2·099	·001	52 38 28·4	6·38	·29
Wa. 8267. La. −4	6	11 27·92	2·104	·001	52 47 3·6	6·41	·29
Do. 2276. K. .	7·5	11 33·43	2·040	·001	50 57 41·5	6·42	·28
Ko. 437. W. .	6·2	12 6·18	2·109	·001	52 53 30·9	6·45	·29
1 Rad. 4284. G. .	6·7	13 4·51	2·018	·001	50 18 25·2	6·54	·27
Ko. 513. L. . .	7·5	19 14 36·65	2·037	·001	50 45 4·9	6·67	·28
K. 524. L. −·5 .	6·7	15 7·47	2·105	·001	52 39 34·6	6·70	·29
K. 568. L. −·5 .	7·5	16 21·79	2·027	·001	50 25 22·4	6·82	·28
K. 571. L. −1·2 .	6·3	16 23·25	2·036	·001	50 39 20·7	6·82	·28
K. 570. L. −·5 .	7·8	16 25·31	2·089	·001	52 7 45·2	6·82	·28
1 Rad. 4306. G.K.	7·1	19 16 43·42	2·050	·001	51 1 49·8	6·86	·29
K. 596. L. +·7 .	8	17 11·47	2·067	·001	51 28 50·3	6·89	·28
Arm. 4065. K. .	8	17 42·19	2·120	·001	53 0 3·6	6·93	·29
K. 642. L. −·7 .	8	18 35·98	2·068	·001	51 26 5·4	7·00	·28
6 B. 3766. . .	7·7	19 8·28	2·021	·001	50 6 52·3	7·05	·27
1 Rad. 4322. G. −·3	7·4	19 19 19·67	2·027	·001	50 17 21·6	7·06	·27
1 Ha. 7499. K. .	7	20 2·29	2·101	·001	52 18 44·6	7·12	·28
1 Rad. 4331. G. .	6·9	21 13·03	2·031	·001	50 18 55·7	7·23	·29
1 Rad. 4333. G.K.	8	21 35·06	2·032	·001	50 19 15·6	7·25	·28
La. 37038.? . .	7·5	23 42·52	2·091	·001	51 51 41·0	7·42	·28
1 Ha. 7592. K. −·9	8	19 24 10·30	2·106	·001	52 14 46·2	7·46	·28
Ko. 832. L. −·4 .	8	24 53·85	2·061	·001	50 57 30·8	7·52	·28
K. 861. L. . .	7·8	25 27·14	2·050	·001	50 36 28·0	7·56	·27
1 Rad 4361 G 1 HK	6·6	26 3·62	2·083	·001	51 30 33·6	7·61	·28
K. 884. L. −·7 .	7·8	26 14·62	2·049	·001	50 32 39·1	7·62	·27
K. 964. L. +·4 .	7·9	19 28 8·72	2·042	·001	50 14 49·9	7·77	·27
Ko. 983. . .	8	28 38·65	2·067	·001	50 56 32·3	7·81	·27
1 Ra. 4390. G. .	6·6	29 20·88	2·102	·001	51 53 43·7	7·87	·26
K. 1024. . .	8	29 40·93	2·037	·001	50 3 53·9	7·90	·27
1 Ra. 4394. G. .	6·7	29 42·59	2·096	·001	51 41 11·0	7·90	·26
1 Ha. 7756. K. .	7·5	19 30 50·05	2·127	·001	52 32 25·7	8·00	·28
1 Rad. 4414. G.K.	7·4	33 46·07	2·108	·001	51 50 1·2	8·23	·28
1 Rad. 4418. G. .	6·8	34 9·08	2·054	·001	50 16 15·9	8·26	·26
1 Rad. 4420. G. .	6·4	34 28·20	2·046	·001	50 2 26·6	8·29	·27
K. 1212. . .	8	34 57·37	2·139	·001	52 38 28·3	8·33	·28
1 Ha. 7822. K. −·4	7·9	19 35 7·57	2·138	·001	52 36 35·1	8·34	·28
1 Ha. 7823. K. +·4	7·9	35 11·68	2·138	·001	52 37 2·–	8·34	·28
1 Rad. 4429. G. 1 H.	6·5	35 33·72	2·104	·001	51 37 29·6	8·37	·26
1 Rad. 4431. G. .	7	35 33·36	2·058	·001	50 18 0·3	8·38	·28
Ma. 9089. L. −·9 .	6·5	36 8·57	2·118	·001	51 58 35·3	8·43	·28
1 Rad. 4434. K. .	7·1	19 36 11·61	2·069	·001	50 33 26·4	8·43	·27
K. 1257. M. .	7·8	36 20·62	2·130	·001	52 17 33·5	8·44	·28
3 Gr. 1599. 2 R. .	5·6	36 32·87	2·157	·001	52 56 48·6	8·50	·28
K. 1314. . .	8	38 2·67	2·153	·001	52 51 7·0	8·57	·28
1 Ra. 4450. G. .	7·2	38 22·46	2·068	·001	50 24 55·4	8·60	·27
1 Ha. 7832. K. .	7·7	19 39 0·87	2·083	·001	50 47 40·2	8·66	·27
Wa. 8525. K. +·5 .	6	39 47·68	2·122	·001	51 54 3·1	8·71	·28
K. 1385. L. −·7 .	8	39 57·91	2·127	·001	52 0 40·4	8·72	·28
L. 37770. . .	7·5	40 28·34	2·146	·001	52 35 1·6	8·77	·28
1 Rad. 4457. G. .	7	41 9·24	2·073	·001	50 23 46·5	8·82	·27

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		h. m. s.		+ s.	+ s.	° ′ ″	− ″	− ″
4 Gr. 2193. 1 R. .	6	19 41 47·96		2·117	·001	51 36 12·9	8·87	·27
2 Rad. 1908. 1 R.	5·3	42 53·98		2·118	·001	51 35 53·7	8·96	·27
L. 37866. . .	6·5	43 2·85		2·148	·001	52 29 29·1	8·97	·28
1 Rad. 4471. G. .	8·1	43 29·08		2·092	·001	50 47 22·3	9·00	·26
1 Ra. 4475. G. .	7·8	43 58·97		2·093	·001	50 47 2·7	9·04	·26
Ko. 1563. . .	8	19 45 16·04		2·166	·001	52 56 16·9	9·15	·28
1 Rad. 4485. G. .	7·7	45 21·22		2·121	·001	51 33 52·8	9·15	·28
K. 1617. L.−·3 .	8	46 41·15		2·135	·001	51 50 53·3	9·24	·27
1 Rad. 4503. G. .	8·2	47 18·24		2·105	·001	50 55 31·2	9·30	·27
4 Gr. 2218. 1 R. .	5·6	48 8·52		2·136	·001	51 50 40·0	9·37	·27
1 Ra. 4507. L. .	6·4	19 48 4·48		2·080	·001	50 9 28·8	9·36	·27
1 Rad. 4519. A. .	6·9	49 44·82		2·141	·001	51 52 36·4	9·49	·28
1 Ra. 4522. 6 B. .	7·4	49 55·03		2·144	·001	51 56 2·1	9·50	·28
Wa. 8619. L.−·5 .	7·5	50 5·72		2·154	·001	52 12 54·2	9·52	·27
Dor. 2392. W.* .	7	50 48·28		2·156	·001	52 13 57·2	9·57	·27
6 B. 3850. K. .	7·6	19 51 29·39		2·132	·001	51 27 36·2	9·63	·27
1 Ra. 4543. G. .	8	52 14·20		2·112	·001	50 48 45·0	9·67	·25
L. 38288. . .	7·2	52 48·83		2·102	·001	51 8 9·6	9·73	·27
K. 1835. L.−·5 .	8	53 10·77		2·174	·001	52 38 47·0	9·75	·27
L. 38320. . .	7	53 31·38		2·166	·001	52 21 36·7	9·78	·27
1 Rad. 4558. G. .	7·9	19 53 50·11		2·089	·001	50 2 50·4	9·80	·26
K. 1867. . .	7·7	54 0·56		2·143	·001	51 36 42·0	9·81	·27
Ma. 9236. P.−·6 .	6·5	54 57·70		2·175	·001	52 32 15·3	9·89	·27
1 Rad. 4571. G. .	7·7	55 22·84		2·098	·001	50 10 36·5	9·91	·25
K. 1936. . .	8	55 41·87		2·136	·001	51 18 5·1	9·94	·27
1 Rad. 4573. G. .	8·1	19 55 45·32		2·095	·001	50 4 16·9	9·94	·25
6 Bo. ‡ 3744. L.−·6	6·2	55 52·42		2·160	·001	52 1 26·3	9·96	·27
6 Bo. 3896. W. .	6·7	57 19·40		2·159	·001	51 52 53·4	10·07	·27
1 Rad. 4590. W. .	7·1	58 39·14		2·141	·001	51 15 41·6	10·17	·26
K. 55. L.−·7 .	7·9	59 46·28		2·160	·001	51 43 46·2	10·25	·27
K. 62. L.−1·0 .	8	19 59 56·56		2·166	·001	51 54 30·7	10·27	·27

1 Ra. 4215-6. Dup. **8**−4″−**8**−234° the mean.
Dor. 2392. Dup. **7**−2″−**8·1**−29° the 1st.
3 Gre. 1552. **4**−28″−**8·1**−85° the 1st.

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		20h.RA	21h.RA			20h.RA	21h.RA			20h.RA	21h.RA
		sec.	sec.			sec.	sec.			sec.	sec.
Jan.	1...	8·37	8·59	May	1...	11·13	10·75	Sept.	8...	12 60	12·96
	11...	8·36	8·51		11...	11·47	11·10		18...	12·43	12·85
	21...	8·41	8·48		21...	11·78	11·45		28...	12·23	12 71
	31...	8·50	8·51		31...	12·07	11·77	Oct.	8...	12·02	12·54
Feb.	10...	8 66	8·59	June	10...	12·32	12·06		18...	11·80	12·34
	20...	8 86	8·72		20...	12·53	12·33		28...	11·57	12·13
Mar.	2...	9·11	8·91		30...	12·69	12·56	Nov.	7...	11·34	11·91
	12...	9·40	9·14	July	10...	12·81	12·75		17...	11·13	11·69
	22...	9·72	9·41		20...	12·88	12·90		27...	10·93	11·47
April	1...	10·07	9 72		30...	12·91	13·00	Dec.	7...	10·76	11·28
	11...	10·42	10·05	Aug.	9...	12·89	13·05		17...	10·63	11·10
	21...	10·78	10·40		19...	12·83	13·06		27...	10·55	10·96
May	1...	11·13	10·75		29...	12·73	13·04		37...	10·51	10·86
				Sept.	8...	12·60	12·96				

TABLE III.

Jan. 1	R. A. 20 h. sec.	R. A. 21 h. sec.	Aug. 12	Jan. 1	R. A. 20 h. sec.	R. A. 21 h. sec.	Aug. 12	Jan. 1	R. A. 20 h. sec.	R. A. 21 h. sec.	Aug. 12
1873	1·16	1·06	1891	1882	0·80	0·89	1900	1891	1·23	1·14	1909
1874	1·06	0·91	1892	1883	0·93	1·04	1901	1892	1·11	1·00	1910
1875	0·89	0·78	1893	1884	1·06	1·18	1902	1893	0·97	0·86	1911
1876	0·77	0·67	1894	1885	1·19	1·30	1903	1894	0·85	0·73	1912
1877	0·68	0·60	1895	1886	1·30	1·39	1904	1895	0·73	0·64	1913
1878	0·62	0·57	1896	1887	1·37	1·43	1905	1896	0·65	0·58	1914
1879	0·60	0·59	1897	1888	1·40	1·43	1906	1897	0·61	0·57	1915
1880	0·63	0·65	1898	1889	1·39	1·37	1907	1898	0·61	0·61	1916
1881	0·70	0·76	1899	1890	1·33	1·27	1908	1899	0·65	0·69	1917
1882	0·80	0·89	1900	1891	1·23	1·14	1909	1900	0·73	0·81	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time — Right Ascension h.	m.	s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance °	′	″	Ann. Var. − ″	Sec. Var. − ″
K. 80. M. . .	7·8	20	0	23·94	2·184	·002	52	23	46·2	10·29	·27
K. 87. W. . .	8		0	28·98	2·179	·002	52	13	59·3	10·30	·27
Wa. 8713. K. .	7·1		0	31·54	2·178	·002	52	13	30·1	10·32	·27
1 Rad 4607 GK − ·3	7·3		1	4·65	2·124	·001	50	34	0·7	10·36	·27
W. 8730. M. .	6·8		2	3·31	2·149	·001	51	13	47·8	10·43	·26
L. 38778. . .	7·8	20	3	33·38	2·178	·002	51	58	38·5	10·54	·27
1 Rad. 4628. G. .	7·7		3	36·56	2·162	·001	51	33	13·2	10·55	·28
1 Ra. 4632. G. .	7·6		3	48·84	2·161	·001	51	29	32·8	10·56	·26
1 Ra. 4637. G. − ·7	7		4	4·35	2·115	·002	50	2	33·8	10·60	·29
K. 258. L. − ·5 .	7·1		4	15·53	2·181	·002	52	1	8·7	10·59	·27
6 B. 3946. K. .	6·8	20	4	22·20	2·178	·002	51	55	51·9	10·60	·27
1 Ra. 4645. G. − ·9	7·3		4	49·61	2·119	·002	50	6	23·2	10·63	·26
1 Ra. 4650. G. .	7·1		5	32·34	2·170	·002	51	36	38·8	10·69	·27
1 Ra. 4651. G. .	7·6		5	33·26	2·171	·002	51	38	51·5	10·69	·26
1 Ra. 4652. K. + ·3	8		5	37·66	2·180	·002	51	53	49·3	10·69	·27
K. 329. W. . .	7·5	20	6	5·93	2·159	·002	51	13	13·5	10·73	·26

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		h. m. s.		+ s.	+ s.	° ′ ″	− ″	− ″
K. 342. . .	7·5	20 6 34·36		2·218	·002	53 1 35·1	10·76	·27
1 Ra.4662.G.K.−·3	7·8	6 41·85		2·122	·002	50 3 0·8	10·76	·24
K. 361. L.−·3 .	7·4	7 8·93		2·208	·002	52 41 12·2	10·80	·27
1 Ra. 4673. G. .	8·1	7 20·74		2·180	·002	51 46 20·4	10·82	·26
1 Ra. 4684. G. .	6·8	8 12·54		2·173	·002	51 29 3·0	10·89	·27
K. 417. . .	8	20 8 35·12		2·212	·002	52 44 35·0	10·91	·27
1 Ra. 4693. D.* .	8	9 0·43		2·149	·002	50 41 18·9	10·94	·26
K. 433. . .	8	9 2·61		2·211	·002	52 42 15·7	10·95	·27
4 Gre. 2274. A. .	5·6	9 9·84		2·127	·002	50 1 15·4	10·96	·26
L. 39054. . .	7	9 27·92		2·196	·002	52 8 56·7	10·97	·26
K. 456. . .	8	20 9 33·25		2·216	·002	52 46 21·3	10·98	·27
1 Ra. 4702. G. .	6·6	9 36·25		2·154	·002	50 47 37·8	10·99	·26
1 Ra. 4703. G. .	8·1	9 48·11		2·176	·002	51 27 11·4	10·99	·25
4 Gr. 2277. 2 R. .	5	9 52·06		2·203	·002	52 21 18·1	11·00	·24
1 Ra.4717.1 H.−·5	7·7	10 52·94		2·134	·002	50 9 47·4	11·08	·26
Wa. 8820. K.+·3 .	7·7	20 10 56·74		2·199	·002	52 6 37·9	11·09	·26
1 Ra. 4719. G. .	6	11 5·64		2·177	·002	51 23 11·0	11·10	·26
K. 510. . .	7·7	11 13·08		2·204	·002	52 13 47·2	11·10	·26
1 Ra. 4722. G. .	7·4	11 17·53		2·169	·002	51 7 5·1	11·12	·28
1 Ra. 4726. G. .	7·7	11 39·14		2·187	·002	51 39 37·4	11·14	·26
K. 531. . .	7·6	20 11 54·36		2·200	·002	52 3 4·4	11·15	·26
4 Gre. 2287. 1 R. .	6	12 24·28		2·167	·002	50 59 24·3	11·19	·26
6 B. 3897. . .	7·9	12 52·50		2·205	·002	52 8 20·2	11·23	·26
1 Ra. 4741. G. .	7·9	13 14·65		2·182	·002	51 21 51·6	11·26	·27
L. 39243. . .	7·5	14 16·06		2·213	·002	52 17 56·9	11·33	·26
2 Gree. 1315. Cy. γ	3·2	20 14 25·00		2·146	·002	50 8 32·4	11·36	·26
Ko. 632. L. . .	8	14 49·75		2·235	·002	52 57 53·8	11·37	·26
1 Ra. 4752. G. .	6·9	15 4·41		2·181	·002	51 11 23·1	11·39	·26
K. 665. L.−·3 .	6	15 44·23		2·236	·002	52 55 35·3	11·43	·26
6 B. 4074. . .	8	16 31·04		2·193	·002	51 26 21·0	11·49	·26
1 Radc. 4771. G. .	7	20 16 58·32		2·156	·002	50 15 7·7	11·53	·26
1 Ra. 4776. . .	8	17 24·03		2·162	·002	50 23 12·9	11·56	·26
1 Ra. 4777. 6 B. .	7·5	17 36·26		2·169	·002	50 36 49·8	11·57	·26
1 Ra. 4778. G. .	7·8	17 39·02		2·160	·002	50 18 34·5	11·57	·26
K. 741. . .	7·9	18 13·88		2·200	·002	51 32 50·5	11·61	·26
1 Rad. 4781. G.−·3	6·9	20 18 13·80		2·152	·002	50 0 25·2	11·60	·25
K. 761. . .	7	18 49·44		2·182	·002	50 54 52·6	11·64	·25
K. 763. . .	8	18 50·48		2·182	·002	50 56 57·7	11·64	·25
1 Ra. 4787. G. .	7·7	18 52·99		2·155	·002	50 3 47·2	11·65	·24
1 Ra. 4793. 6 B. .	7·4	19 30·15		2·177	·002	50 40 45·0	11·70	·26
4 Gr. 2302. A. .	6	20 19 35·97		2·214	·002	51 58 10·1	11·67	·26
K. 806. . .	8	20 26·97		2·236	·002	52 37 30·0	11·77	·26
L. 39496. W. .	7·4	20 29·69		2·192	·002	51 5 11·8	11·77	·25
Ko. 828. . .	7·7	21 10·54		2·246	·002	52 54 15·6	11·82	·26
1 Ra. 4836. K. .	7·4	23 31·39		2·182	·002	50 29 0·9	11·99	·26
K. 945. L.+·3 .	8	20 24 45·03		2·206	·002	51 9 17·2	12·06	·25
6 B. 4232. . .	7·9	25 11·40		2·189	·002	50 33 31·1	12·11	·25
K. 976. L.−1·6 .	8	25 42·04		2·230	·002	51 50 41·0	12·13	·25
K. 893. cL.−·3 .	8	25 52·61		2·227	·002	51 44 17·2	12·14	·25
K. 994. W. . .	7·5	26 18·39		2·254	·002	52 34 38·2	12·17	·25
K. 1064. . .	8	20 28 23·99		2·216	·003	51 14 21·4	12·32	·25
Wa. 8978. L.+·9 .	7	29 17·97		2·255	·003	52 20 16·4	12·39	·25
Wa. 8979. L.+·4 .	6	29 19·52		2·248	·003	52 6 17·5	12·39	·25

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Authority and Star's Name	Mag.	In Mean Solar Time: Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. − ″
L. 39891. . .	7	20 29 33·45	2·261	·003	52 30 23·5	12·41	·25
K. 1130. . .	8	30 13·44	2·214	·003	50 53 35·1	12·45	·25
Wa. 8995. D.K.L.*	6·7	30 34·68	2·257	·003	51 47 43·6	12·48	·25
K. 1168. . .	7·9	31 27·61	2·250	·003	52 2 56·1	12·53	·25
6 B. 4181. . .	8	31 50·52	2·243	·003	51 40 58·3	12·57	·25
6 B. 4183. . .	8	20 32 15·33	2·243	·003	51 39 49·3	12·59	·25
1 Rad. 4914. G. .	6·5	32 57·11	2·236	·003	51 21 42·6	12·65	·26
K. 1238. . .	7·8	33 52·27	2·229	·003	50 55 44·7	12·70	·25
K. 1301. L. . .	7·4	35 47·02	2·234	·003	50 59 27·1	12·82	·24
K. 1302. . .	8	35 47·14	2·223	·003	50 37 38·8	12·82	·24
K. 1314. . .	8	20 36 20·94	2·223	·003	50 42 17·2	12·87	·24
K. 1350. L.−·7 .	8	37 55·36	2·259	·003	51 37 55·0	12·97	·24
K. 1407. W. .	6·7	39 53·43	2·251	·003	51 10 21·8	13·10	·24
1 Ra. 4970. G. .	7·5	40 52·18	2·267	·003	51 35 49·3	13·17	·25
Dor. 2526. L. .	7·5	40 55·67	2·240	·003	50 40 14·9	13·18	·24
L. 40293. . .	7·9	20 41 2·06	2·255	·003	51 10 24·9	13·18	·24
6 B. 4076. . .	7·2	43 17·35	2·299	·003	52 28 41·6	13·33	·24
Ko. 1490. L.−·4 .	8	43 17·82	2·252	·003	50 48 56·3	13·33	·24
6 B. 4254. K. .	7·8	43 20·03	2·260	·003	51 4 31·8	13·34	·24
Ko. 1510. L.−·5 .	7	44 6·40	2·259	·003	50 58 12·4	13·38	·24
K. 1526. . .	8	20 44 32·53	2·281	·003	51 39 55·8	13·41	·24
K. 1590. L.+·7 .	8	46 54·99	2·276	·004	51 15 33·9	13·57	·24
cL. 40492. . .	6·5	47 15·86	2·247	·004	50 10 31·8	13·59	·24
1 H. 8716. L.+·3 .	7·7	47 24·71	2·286	·004	51 34 28·7	13·60	·24
1 Ra. 5025. K. .	7·7	47 29·32	2·266	·004	50 51 15·9	13·60	·24
K. 1623. . .	8	20 48 15·52	2·311	·004	52 23 21·4	13·65	·24
1 Rad. 5037. G. .	7·2	49 25·17	2·272	·004	50 49 9·2	13·73	·24
1 Ra. 5039. 6 B. .	8	49 32·11	2·270	·004	50 46 9·9	13·74	·24
1 Rad. 5040. .	8	49 35·26	2·259	·004	50 21 54·6	13·74	·24
1 Ra. 5041. G. .	7·6	49 47·51	2·255	·004	50 12 35·0	13·76	·24
K. 1672. . .	7·7	20 50 14·26	2·280	·004	51 0 24·9	13·78	·24
K. 1675. . .	8	50 22·62	2·316	·004	52 20 5·2	13·79	·24
K. 1688. . .	7·8	50 56·95	2·324	·004	52 33 19·3	13·83	·24
1 H. 8765. L.−·6 .	8	51 1·96	2·266	·004	50 25 36·0	13·83	·23
1 Ra. 5061. A.G. .	6·8	51 28·36	2·302	·004	51 39 47·9	13·86	·24
Wa. 9196. 1 R. & G.	6·5	20 51 43·13	2·286	·004	50 14 11·6	13·88	·24
K. 1719. . .	8	52 18·54	2·261	·004	50 9 25·0	13·91	·23
K. 1723. W. .	8	52 34·02	2·338	·004	52 50 9·3	13·93	·24
K. 1730. . .	8	52 42·70	2·275	·004	50 40 7·8	13·93	·23
1 Rad. 5076. D. .	7·4	53 35·96	2·296	·004	51 13 46·8	13·99	·25
1 H. 8831. K. .	7·7	20 53 44·18	2·268	·004	50 10 49·1	14·00	·23
Dor. 2543.* .	7·7	54 3·04	2·341	·004	52 49 40·4	14·02	·24
1 Ra. 5081. G.A. .	6·5	54 7·28	2·291	·004	50 58 58·2	14·03	·24
4 Gr. 2385. 1 R. .	6·7	54 47·81	2·317	·004	51 50 9·4	14·07	·24
K. 1798. W. .	7·5	54 58·64	2·332	·004	52 20 28·9	14·08	·24
K. 1799. . .	8	20 55 5·64	2·276	·004	50 14 53·1	14·08	·23
1 H. 8889. K. .	8	57 35·81	2·308	·004	51 10 21·1	14·24	·23
4 Gree. 2393. Cy. 61*	5·6	57 50·95	2·666	·004	51 51 51·9	17·48	·23
4 Gree. 2394. Cy. 61*	5·6	57 52·53	2·672	·004	51 52 0·6	17·26	·23
L. 40980. . .	7·5	58 13·21	2·345	·004	52 27 27·5	14·28	·23

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		h. m. s.		+ s.	+s.	° ′ ″	− ′	− ″
1 Radc. 5111. 2 R.	8·1	20 58 35·20		2·334	·004	51 57 43·2	14·31	·24
K. 10. 1 H. . .	7·7	58 47·62		2·340	·004	52 11 16·3	14·31	·23
2 Radc. 2063. 1 R.	7·9	59 45·72		2·337	·004	51 58 30·2	14·37	·23

1 Ra. 4693. Dup. **8** − 5″ − **8·5** − 325° the 2nd. Wa. 8995. Dup. **6·7** − 12″ − **8·7** − 348° the 2nd.
Dor. 2543. Dup. **7·7** − 5″ − **8** − 258° the mean. 4 Gree. 2393. P.M. + ·339 s. and − 3·22″.
4 Gree. P.M. + ·345 s. and − 3·00″.

21

hours

TABLE II.

		21h.RA sec.	22h.RA sec.			21h.RA sec.	22h.RA sec.			21h.RA sec.	22h.RA sec.
Jan.	1...	8·59	8·90	May	1...	10·75	10·39	Sept.	8...	12·96	13·27
	11...	8·51	8·77		11...	11·10	10·74		18...	12·85	13·24
	21...	8·48	8·68		21...	11·45	11·09		28...	12·71	13·16
	31...	8·51	8·63		31...	11·77	11·43	Oct.	8...	12·54	13·04
Feb.	10...	8·59	8·64	June	10...	12·06	11·77		18...	12·34	12 90
	20...	8·72	8·70		20...	12·33	12·07		28...	12·13	12·72
Mar.	2...	8·91	8·81		30...	12·56	12·36	Nov.	7...	11·91	12·53
	12...	9·14	8·98	July	10...	12·75	12·61		17...	11·69	12·33
	22...	9·41	9·19		20...	12·90	12·82		27...	11·47	12·11
April	1...	9·72	9·44		30...	13·00	13·00	Dec.	7...	11·28	11·90
	11...	10 05	9 73	Aug.	9...	13·05	13·13		17...	11·10	11·70
	21...	10·40	10·05		19...	13·06	13·22		27...	10·95	11·52
May	1...	10·75	10·39		29...	13·04	13·27		37...	10·86	11 37
				Sept.	8...	12·96	13·27				

TABLE III.

Jan. 1	R. A. 21 h. sec.	R. A. 22 h. sec.	Aug. 12	Jan. 1	R. A. 21 h. sec.	R. A. 22 h sec.	Aug. 12	Jan. 1	R. A. 21 h. sec.	R. A. 22 h. sec.	Aug. 12
1873	1·06	0·95	1891	1882	0·89	0·99	1900	1891	1·14	1·05	1909
1874	0·91	0·80	1892	1883	1·04	1·15	1901	1892	1·00	0·89	1910
1875	0 78	0·68	1893	1884	1.18	1·29	1902	1893	0 86	0·75	1911
1876	0·67	0·59	1894	1885	1·30	1·39	1903	1894	0·73	0·64	1912
1877	0·60	0·54	1895	1886	1 39	1·46	1904	1895	0·64	0·57	1913
1878	0·57	0·55	1896	1887	1·43	1·47	1905	1896	0·58	0·54	1914
1879	0·59	0·61	1897	1888	1·43	1·42	1906	1897	0·57	0·57	1915
1880	0·65	0·70	1898	1889	1·37	1·33	1907	1898	0·61	0·64	1916
1881	0·76	0·84	1899	1890	1·27	1·20	1908	1899	0·69	0·75	1917
1882	0·89	0·99	1900	1891	1·14	1·05	1909	1900	0·81	0·90	1918

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MEAN PLACES OF FIXED STARS FOR JANUARY 1, 1875.

AUTHORITY AND STAR'S NAME	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. − ″
K. 32. . . .	8	21 0 4·93	2·308	·005	50 50 14·3	14·38	·23
Wa. 9251. L.−·8 .	7·8	0 47·93	2·335	·005	51 46 36·7	14·44	·23
6 B. 4205. . .	8	2 14·55	2·361	·005	52 35 36·6	14·53	·23
K. 88. . . .	7·9	2 16·13	2·370	·005	53 0 35·9	14·52	·23
K. 92. L.−1·0 .	7·8	2 18·02	2·334	·005	51 32 52·1	14·53	·23
L. 41202. . .	7	21 3 41·23	2·348	·005	51 53 53·7	14·61	·23
6 B. 4479. . .	8	3 55·87	2·308	·005	50 21 41·3	14·63	·22
1 H. 9018. W. .	7·5	4 6·87	2·350	·005	51 56 48·3	14·64	·23
K. 164. . .	8	4 39·71	2·340	·005	51 33 15·6	14·67	·23
1 H. 9038. L. .	8	5 1·21	2·357	·005	52 6 45·9	14·70	·23
K. 184. . .	7·3	21 5 39·67	2·376	·005	52 44 5·3	14·73	·23
6 B. 4409. W. .	7·1	6 1·77	2·340	·005	51 16 30·8	14·75	·22
3Gre.1756.2R.Cy.τ	4	6 20·08	2·385	·005	52 29 14·3	15·24	·23
L. 41371. . .	8	7 57·75	2·350	·005	51 25 24·8	14·86	·22
3Gr.1760.1R.Cy.σ	4·5	9 2·00	2·346	·005	51 7 43·1	14·90	·22
1 H. 9104. W. .	7	21 9 12·36	2·351	·005	51 18 43·5	14·95	·22
1 Rad. 5173. D. .	7·7	9 14·43	2·337	·005	50 46 39·7	14·95	·23
1 R. 5181. K. .	7	10 36·90	2·342	·005	50 46 38·2	15·03	·23
Wa. 9318. K.+·4 .	7·3	10 53·69	2·368	·005	51 43 13·0	15·04	·22
6 B. 4271. W. .	6·2	10 54·45	2·382	·006	52 17 22·6	15·04	·22
K. 326. . .	8	21 11 6·31	2·322	·005	50 3 14·7	15·05	·22
K. 342. L.−1·1 .	8	11 46·08	2·373	·005	51 50 23·6	15·09	·22
cL. 41541. . .	6·5	12 39·17	2·333	·005	50 10 19·2	15·14	·22
Wa. 9348. L.+·9 .	8	14 5·16	2·380	·006	51 46 16·2	15·22	·22
Wa. 9350. L.+1·0	6·5	14 18·17	2·384	·006	51 53 54·7	15·23	·22
L. 41627. . .	7	21 14 26·26	2·383	·006	51 49 1·9	15·25	·22
6 B. 4476. . .	7·8	14 50·64	2·368	·006	51 11 4·6	15·27	·22
L. 41661. . .	6·8	15 10·39	2·353	·006	50 30 59·6	15·29	·22
K. 448. . .	7·8	15 41·86	2·412	·006	52 52 30·7	15·32	·22
K. 501. . .	7·5	18 13·21	2·421	·006	53 1 25·7	15·45	·22
L. 41771. . .	8	21 18 26·03	2·374	·006	50 52 53·0	15·46	·21
Ko. 555. . .	8	20 25·53	2·426	·006	52 58 1·7	15·58	·22
K. 559. L.−·4 .	7·9	20 29·33	2·364	·006	50 9 42·9	15·58	·21
6 B. 4568. . .	8	20 31·84	2·362	·006	50 4 35·7	15·59	·21
K. 564. L. . .	7·5	20 36·56	2·366	·006	50 14 35·2	15·58	·21
Ko. 606. . .	7·3	21 22 13·15	2·427	·006	52 34 59·2	15·67	·21
K. 619. . .	8	22 38·27	2·410	·006	51 47 28·9	15·70	·21
K. 621. L.−·6 .	7·1	22 54·40	2·381	·007	50 29 2·7	15·71	·21
K. 629. L.−·3 .	7·8	23 8·64	2·404	·007	51 25 23·8	15·73	·21
L. 42010. . .	8	24 16·32	2·409	·006	51 28 49·0	15·79	·21
L. 42022. . .	7·7	21 24 23·48	2·379	·007	50 8 39·9	15·80	·21
K. 668. M. . .	8	24 59·53	2·426	·007	52 1 35·8	15·82	·21
4 Gre. 2450. 2 R. .	5	26 9·03	2·439	·007	52 1 32·5	15·99	·21
1 Ra. 5292. W. .	7·6	26 23·74	2·408	·006	51 7 14·5	15·90	·20
K. 738. L.−·4 .	8	27 25·36	2·394	·007	50 21 6·7	15·95	·21
K. 739. . .	7·6	21 27 29·59	2·445	·007	52 41 1·0	15·96	·21
K. 745. . .	8	27 35·48	2·428	·007	51 46 58·6	15·96	·21
1 Ra.5305.G.K.−·3	8·4	27 58·18	2·413	·007	51 4 47·2	15·98	·21
4 Gr. 2455. 1 R. .	5	28 24·73	2·392	·007	50 8 50·6	16·02	·20
1 Ra. 5316. W. .	6·8	29 12·43	2·422	·007	51 14 40·4	16·06	·21

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		h. m. s.		+ s.	+ s.	° ′ ″	− ″	− ″
1 Rad. 5325. G. .	8·1	21 29 53·91		2·420	·007	51 3 9·8	16·09	·21
1 Ra. 5337. G. .	7 2	31 16·31		2·425	·007	51 3 3·3	16·16	·21
1 Ra. 5353. G. .	7·9	32 41·02		2·431	·007	51 5 38·2	16·23	·21
K. 891. . .	7·8	33 13·59		2·408	·007	50 2 34·7	16·26	·20
K. 895. W. . .	7·5	33 24·14		2·477	·007	53 1 8·6	16·27	·20
1 Rad. 5359. G. .	7·2	21 33 36·10		2·434	·007	51 2 39·0	16·28	·21
K. 914. W. . .	8	34 12·65		2·472	·007	52 40 3·6	16·31	·20
6 Bo. 4407. W. .	7	34 33·39		2·471	·007	52 33 13·1	16·33	·20
1 Gre. 1936. W. .	5·6	34 42·63		2·465	·007	52 17 16·2	16·34	·21
1 G. 1937. W. .	7	34 53·82		2·466	·007	52 15 58·6	16·35	·21
Ko. 1002. . .	8	21 37 45·32		2·442	·008	50 43 34·2	16·49	·20
Wa. 9540. K.−·3 .	8	37 59·94		2·491	·008	52 55 8·4	16·51	·20
1 Rad. 5398. G. .	7·2	39 34·63		2·470	·008	51 37 24·6	16·58	·20
Wa. 9555. L.+·3 .	6·3	39 44·72		2·477	·008	51 55 54·2	16·59	·20
1 Rad. 5400. G.K.	8·1	39 52·81		2·468	·008	51 29 51·5	16·60	·20
Wa. 9561. K.+·6 .	8	21 40 31·24		2·486	·008	52 14 1·1	16·63	·20
6 B. 4691. . .	8	41 41·93		2·506	·008	52 59 33·2	16·69	·19
1 Ra. 5413. 1 H. .	7·4	41 42·84		2·468	·008	51 8 27·8	16·69	·20
1 Rad. 5426. G. .	6·2	42 20·78		2·468	·008	51 2 53·1	16·72	·20
6 B. 4441. W.−·6*	8	43 11·32		2·495	·008	52 8 51·6	16·76	·19
L. 42671. W. .	7	21 43 15·26		2·484	·008	51 37 53·6	16·76	·19
Was. 9588. L.−·7	8	43 28·61		2·486	·008	51 39 54·0	16·77	·19
K. 1140. L.−·5 .	7	44 1·47		2·488	·008	51 45 5·7	16·79	·19
Wa. 9631. 1 H.+·3	7·6	49 16·05		2·509	·009	51 40 5·3	17·05	·18
Ko. 1314. L.−·9 .	8	50 36·19		2·533	·009	52 37 22·7	17·10	·19
1 Ra. 5503. 1 H. .	7·4	21 52 2·30		2·507	·010	51 4 25·7	17·18	·19
1 Ra. 5507. K. .	7·1	52 15·09		2·514	·010	51 21 14·8	17·19	·20
L. 43027. . .	7·9	53 57·75		2·518	·010	51 10 28·6	17·26	·18
1 Ra. 5520. L.−·4	7·9	54 2·70		2·515	·010	51 2 24·6	17·27	·19
Ko. 1492. . .	7·8	56 13·37		2·525	·010	51 7 29·5	17·36	·18
Ko. 1499. . .	7·5	21 56 21·81		2·522	·010	50 55 35·9	17·36	·18
K. 1554. . .	7·8	58 7·42		2·562	·010	52 42 29·1	17·44	·18
Ko. 13. R. . .	8	58 49·56		2·538	·010	51 16 3·6	17·46	·17
Ko. 15. . .	8	58 52·24		2·524	·010	50 30 12·0	17·47	·17
Ko. 26. L.+·3 .	8	59 34·96		2·541	·010	51 14 25·3	17·50	·17
K. 33. . .	8	21 59 41·68		2·527	·010	50 29 45·3	17·50	·17
Ko. 35. L. . .	8	59 47·98		2·542	·010	51 11 25·4	17·51	·17

6 B. 4441. W.'s N.P.D. is 30″+.

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		22h.RA	23h.RA			22h.RA	23h.RA			22h.RA	23h.RA
		sec.	sec.			sec.	sec.			sec.	sec.
Jan.	1...	8·90	9·28	May	1...	10·39	10·07	Sept.	8...	13·27	13·51
	11...	8·77	9·11		11...	10·74	10·40		18...	13·24	13·55
	21...	8·68	8·97		21...	11·09	10·74		28...	13·16	13·55
	31...	8·63	8·87		31...	11·43	11·09	Oct.	8...	13·04	13·50
Feb.	10...	8·64	8·81	June	10...	11·77	11·44		18...	12·90	13·42
	20...	8 70	8·79		20...	12·07	11·77		28...	12 72	13·30
Mar.	2...	8·81	8·83		30...	12·36	12·10	Nov.	7...	12·53	13·15
	12...	8·98	8·92	July	10...	12·61	12·40		17...	12·33	12·98
	22...	9·19	9·07		20...	12·82	12·68		27...	12·11	12·79
April	1...	9·44	9·26		30...	13·00	12·92	Dec.	7...	11·90	12·58
	11...	9 73	9·49	Aug.	9...	13·13	13·12		17...	11·70	12·38
	21...	10·05	9·77		19...	13·22	13·29		27...	11·52	12·18
May	1...	10·39	10·07		29...	13·27	13·42		37...	11·37	12·00
				Sept.	8...	13·27	13·51				

TABLE III.

	R. A.	R. A.			R. A.	R. A.			R. A.	R. A.	
Jan. 1	22 h.	23 h.	Aug. 12	Jan. 1	22 h.	23 h.	Aug. 12	Jan. 1	22 h.	23 h.	Aug. 12
	sec.	sec.			sec.	sec.			sec.	sec.	
1873	0·95	0·85	1891	1882	0·99	1·09	1900	1891	1 05	0·95	1909
1874	0·80	0 71	1892	1883	1·15	1·25	1901	1892	0·89	0·79	1910
1875	0 68	0·60	1893	1884	1·29	1·37	1902	1893	0·75	0·66	1911
1876	0·59	0·54	1894	1885	1·39	1·46	1903	1894	0·64	0·57	1912
1877	0·54	0·52	1895	1886	1·46	1·49	1904	1895	0·57	0·52	1913
1878	0·55	0·56	1896	1887	1·47	1·46	1905	1896	0·54	0·53	1914
1879	0·61	0·65	1897	1888	1·42	1·38	1906	1897	0·57	0·59	1915
1880	0·70	0·77	1898	1889	1·33	1·26	1907	1898	0·64	0·69	1916
1881	0·84	0·93	1899	1890	1·20	1·11	1908	1899	0·75	0·83	1917
1882	0·99	1·09	1900	1891	1·05	0·95	1909	1900	0·90	0·99	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time — Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. − ″
K. 105. . .	8	22 1 42·78	2·533	·011	50 21 10·0	17·59	·17
1 Rad. 5589. 6 B. .	7·7	2 19·25	2·537	·010	50 26 47·5	17·62	·18
Ko. 123. L. . .	7·2	2 24·63	2·547	·011	50 54 10·9	17·61	·17
Ko. 130. L. — 3 .	7	2 44·44	2·572	·011	52 11 57·6	17·63	·17
Dorp. 2678. K. .	7·7	2 57·14	2·586	·010	52 57 53·7	17·65	·17
6 B. 4507. . .	8	22 3 0·58	2·582	·011	52 43 46·5	17·65	·17
Ko. 164. . .	8	4 4·23	2·577	·011	52 10 34·2	17·68	·17
Ko. 172. . .	8	4 24·00	2·564	·011	51 23 26·4	17·69	·17
3 Gre. 1859. 1 R. .	5	4 53·30	2·565	·011	50 54 17·0	17·73	·17
1 Ra. 5617. 1 H. .	7·3	5 18·00	2·545	·011	50 8 6·8	17·74	·18
K. 207. . .	8	22 5 45·24	2·582	·011	52 7 1·6	17·76	·17
La. 43465. . .	7·5	6 13·63	2·562	·011	50 50 45·5	17·78	·17
6 B. 4721. . .	7·2	6 51·79	2·581	·011	51 45 55·0	17·81	·16
3 Gr. 1861. W. .	5·4	6 53·31	2·599	·011	52 52 23·9	17·81	·17
K. 271. W. . .	7·3	8 45·84	2·586	·011	51 35 58·1	17·88	·16
K. 282. . .	8	22 9 7·68	2·571	·012	50 39 25·3	17·89	·16

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		h. m. s.		+ s.	+ s.	° ′ ″	− ″	− ″
2 R. 2197. W. .	6·3	22 9 49·11		2·612	·011	52 51 28·4	17·92	·16
K. 343. . .	8	12 41·57		2·584	·012	50 37 3·2	18·04	·16
6 Bon. 4560. W. .	6·7	14 43·51		2·647	·012	52 3 45·9	18·23	·15
K. 405. . .	8	15 28·30		2·607	·012	51 12 23·2	18·14	·15
6 B. ‡ 4575. . .	7·8	17 30·36		2·629	·012	52 0 41·8	18·22	·15
La. 43871. W. .	8	22 17 56·92		2·614	·013	50 57 51·4	18·23	·15
K. 467. L. . .	6	18 18·17		2·613	·013	50 49 35·5	18·24	·15
K. 479. . .	7·8	18 34·76		2·645	·012	52 48 52·9	18·25	·15
K. 523. . .	8	21 2·90		2·639	·013	51 57 16·2	18·34	·15
6 Bo. 4856. . .	7·9	21 19·91		2·620	·014	50 26 22·5	18·35	·14
K. 547. L.+·7 .	8	22 22 4·65		2·638	·013	51 23 38·8	18·38	·15
1 Ra. 5731. G.+·3	7·9	23 11·25		2·621	·013	50 1 34·4	18·42	·15
4 Gree. 2582. 1 R.	6	23 14·34		2·635	·013	50 51 45·6	18·43	·14
K. 593. W. . .	7·5	24 6·57		2·665	·013	52 30 55·4	18·45	·14
K. 607. L.−·8 .	8	24 53·60		2·648	·013	51 18 29·8	18·47	·14
1 Rad. 5752. G. .	7·5	22 26 12·86		2·651	·014	51 3 39·0	18·52	·15
4 Gr. 2588. 1 R. .	6	26 37·42		2·652	·014	51 1 6·2	18·53	·14
4 Gr. 2589. 1 R. .	6	26 37·56		2·651	·014	51 0 44·2	18·52	·14
1 Ra. 5757. L.+·3	7·2	26 57·91		2·658	·014	51 18 32·0	18·54	·15
K. 673. . .	8	27 2·67		2·647	·014	50 33 26·5	18·55	·14
K. 672. L. . .	6·9	22 27 4·29		2·679	·013	52 48 18·5	18·55	·14
K. 680. L. . .	8	27 18·37		2·681	·013	52 55 6·5	18·56	·14
K. 709. L.+·8 .	8	28 12·46		2·662	·014	51 12 32·8	18·59	·14
4 Gre. 2595. 1 R. .	5	29 57·44		2·674	·014	51 35 59·7	18·64	·14
K. 762. . .	7·7	30 7·13		2·654	·015	52 2 57·2	18·64	·13
cL. 44342. . .	7·3	22 30 10·72		2·693	·013	52 54 22·1	18·65	·14
La. 44344. . .	6	30 12·92		2·695	·013	53 3 26·9	18·65	·14
K. 772. W. . .	6·9	30 14·41		2·680	·014	51 54 6·8	18·65	·13
La. 44361. . .	7·8	30 51·11		2·699	·013	53 7 19·8	18·67	·14
1 Ra. 5793. G. .	5·7	32 10·88		2·668	·014	50 25 36·8	18·71	·14
K. 857. W. . .	6·5	22 33 32·76		2·707	·014	52 51 4·2	18·75	·13
1 Rad. 5808. G. .	6·1	34 44·23		2·690	·015	51 11 20·4	18·79	·14
La. 44492. . .	8	34 22·53		2·711	·013	52 57 12·4	18·79	·14
1 Ra. 5813. W. .	6·4	35 30·74		2·696	·015	51 27 16·1	18·82	·14
K. 923. . .	7·8	36 42·52		2·711	·015	52 9 30·6	18·85	·13
6 Bo. 4688. K. .	8	22 37 6·58		2·714	·015	52 13 46·0	18·87	·12
Do. 2754. K. .	7·3	37 33·38		2·704	·016	51 14 33·1	18·88	·12
K. 966. L.−·8 .	8	38 42·80		2·710	·015	51 23 13·0	18·91	·12
K. 980. . .	8	39 4·39		2·727	·015	52 37 13·5	18·92	·12
K. 982. . .	8	39 14·04		2·727	·015	52 33 0·2	18·93	·12
K. 990. L.−·4 .	8	22 39 24·46		2·722	·015	52 7 55·3	18·93	·12
K. 991. . .	8	39 35·47		2·708	·016	50 50 53·4	18·94	·12
Dor. 2756. K.+·4*	7·6	40 17·60		2·702	·016	50 8 39·2	18·96	·12
K. 1065. L.−·7 .	8	42 46·84		2·734	·016	51 55 4·7	19·03	·12
1 Ra. 5863. G. .	7·6	42 54·78		2·716	·016	50 23 51·2	19·04	·13
K. 1076. . .	6·8	22 43 25·71		2·739	·016	52 2 51·2	19·05	·12
1 Rad. 5869. G. .	6·4	43 44·80		2·721	·016	50 29 46·2	19·06	·13
K. 1085. L.+·3 .	8	44 2·24		2·743	·016	52 13 10·1	19·07	·12
1 Rad. 5876. G.−·5	6·1	44 38·80		2·722	·016	50 17 21·1	19·08	·12
1 Rad. 5894. G. .	7·4	48 5·45		2·750	·016	51 16 44·8	19·18	·12
1 Ra. 5895. W. .	7·1	22 48 9·74		2·751	·016	51 21 32·2	19·18	·12
6 B. 4981. . .	7·7	49 6·60		2·751	·017	50 52 29·9	19·20	·11
Wa. 10124. K.+·4	6·7	51 20·55		2·773	·017	51 57 43·6	19·25	·10

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Authority and Star's Name	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. − ″
K. 1263. L. . .	8	22 52 17·29	2·772	·017	51 33 47·8	19·27	·10
K. 1282. L.−·4 .	8·5	53 11·88	2·768	·018	50 46 44·7	19·30	·10
6 B. ‡ 4752. L. .	7·5	53 42·97	2·787	·017	52 22 21·5	19·31	·10
6 B. 4765. . .	7·7	56 45·20	2·798	·018	52 6 22·3	19·38	·09
K. 1375. L.−1·0 .	7·5	57 13·76	2·802	·017	52 25 59·0	19·39	·10
6 B. 4768. . .	7·7	22 57 15·22	2·805	·017	52 39 34·4	19·39	·09
K. 1383. . .	7·9	57 38·60	2·782	·018	50 7 26·5	19·39	·09
Dor. 2788. K.+·3	8	58 9·57	2·792	·018	50 52 50·9	19·41	·09
1 Ra. 5970. K. .	7·5	59 7·03	2·802	·018	51 30 29·3	19·43	·10
1 Ra. 5973. W. .	7·4	59 17·36	2·805	·018	51 45 41·0	19·44	·09
1 Ra. 5975. K. .	8	22 59 35·52	2·795	·018	50 32 34·4	19·44	·09

Dorp. 2678. Dup. **7·7**−12″−**9·2**−68°.
Dor. 2756. Dup. **8**−5″−**8**−253° the mean.
2 R. 2197. Dup. **6**−15″−**8·2**−193°.

23
hours

TABLE II.

		23h.RA sec.	24h.RA sec.			23h.RA sec.	24h.RA sec.			23h.RA sec.	24h.RA sec.
Jan.	1...	9·28	9·72	May	1...	10·07	9·82	Sept.	8...	13·51	13·64
	11...	9·11	9·53		11...	10·40	10·11		18...	13·55	13·77
	21...	8·97	9·35		21...	10·74	10·42		28...	13·55	13·85
	31...	8·87	9·20		31...	11·09	10·76	Oct.	8...	13·50	13·80
Feb.	10...	8·81	9·08	June	10...	11·44	11·10		18...	13·42	13 88
	20...	8 79	9·00		20...	11·77	11·45		28...	13·30	13 83
Mar.	2...	8·83	8·97		30...	12·10	11·80	Nov.	7...	13·15	13·74
	12...	8 92	8·99	July	10...	12·40	12·14		17...	12·98	13·62
	22...	9 07	9·06		20...	12·68	12·46		27...	12·79	13·47
April	1...	9·26	9 18		30...	12·92	12·76	Dec.	7...	12·58	13·29
	11...	9 49	9·35	Aug.	9...	13·12	13·03		17...	12·38	13·10
	21...	9 77	9·56		19...	13·29	13·27		27...	12·18	12·90
May	1...	10·07	9·82		29...	13·42	13·48		37...	12·00	12·70
				Sept.	8...	13·51	13·64				

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Jan. 1	R. A. 23 h. sec.	R. A. 24 h. sec.	Aug. 12	Jan. 1	R. A. 23 h. sec.	R. A. 24 h. sec.	Aug. 12	Jan. 1	R. A. 23 h. sec.	R. A. 24 h. sec.	Aug. 12
1873	0·85	0·76	1891	1882	1·09	1·19	1900	1891	0·95	0.85	1909
1874	0·71	0 63	1892	1883	1·25	1·33	1901	1892	0·79	0·71	1910
1875	0·60	0·55	1893	1884	1·37	1·43	1902	1893	0·66	0·60	1911
1876	0·54	0·51	1894	1885	1·46	1·49	1903	1894	0·57	0·53	1912
1877	0·52	0·53	1895	1886	1·49	1·49	1904	1895	0·52	0·51	1913
1878	0·56	0·60	1896	1887	1·46	1·43	1905	1896	0·53	0·55	1914
1879	0·65	0·71	1897	1888	1·38	1·32	1906	1897	0·59	0·64	1915
1880	0·77	0·86	1898	1889	1·26	1·18	1907	1898	0·69	0·77	1916
1881	0·93	1·02	1899	1890	1·11	1·02	1908	1899	0·83	0·92	1917
1882	1·09	1·19	1900	1891	0·95	0·85	1909	1900	0·99	1·09	1918

TABLE IV.—Mean Places of Fixed Stars for January 1, 1875.

Authority and Star's Name	Mag.	In Mean Solar Time — Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. − ″
K. 32. L. . .	8	23 0 6·29	2·820	·017	52 59 23·4	19·45	·09
1 Ra. 5977. G. .	7	0 12·77	2·804	·018	51 12 28·2	19·46	·09
K. 69. cL. . .	7·3	1 43·06	2·822	·018	52 27 32·2	19·48	·09
1 Rad. 5998. D. .	7·5	3 23·86	2·814	·019	50 40 37·4	19·52	·09
Ro. 53. L. . .	8	3 53·00	2·823	·019	51 25 40·3	19·51	·09
L. 45574. . .	8	23 6 37·81	2·838	·019	51 43 21·7	19·58	·08
K. 200. W. . .	7·6	7 9·87	2·847	·018	52 43 9·9	19·60	·08
Ko. 208. L. . .	8	7 24·77	2·851	·018	52 55 16·3	19·60	·08
Ko. 246. . .	8	9 27·49	2·840	·020	50 33 44·0	19·64	·08
1 Ra. 6034. G.K. .	7·6	9 57·30	2·850	·018	51 23 37·2	19·64	·08
4 Gr. 2675. 2 R. .	6	23 11 2·94	2·872	·019	52 29 59·6	19·60	·07
K. 290. L. . .	7·3	11 28·49	2·862	·019	52 6 8·8	19·66	·07
K. 330. L.+·3 .	8	13 20·14	2·867	·020	51 31 31·3	19·70	·07
Ko. 389. L.−·5 .	7	16 9·12	28·77	·020	51 20 50·5	19·74	·07
K. 402. L.−·9 .	7·7	16 36·62	2·873	·021	50 17 34·0	19·75	·06
Ko. 414. L.−·3* .	8	23 17 14·75	2·892	·020	52 39 59·9	19·76	·06
K. 433. . .	8	17 44·19	2·892	·020	52 26 39·3	19·77	·06
K. 457. W. . .	8	18 45·43	2·889	·021	50 3 37·3	19·78	·06
L. 46002. . .	7·9	19 41·25	2·899	·020	52 2 43·1	19·80	·06
Ko. 503. W. .	6·5	20 43·54	2·904	·021	52 1 41·1	19·81	·06
4 Gr. 2692. 2 R. .	6	23 21 18·55	2·925	·021	51 27 2·2	19·74	·06
Wa. 10396. L.−·3	7·5	22 0·49	2·911	·020	52 22 56·5	19·83	·06
Ko. 554. L.−·6 .	8	23 15·00	2·914	·021	52 1 6·1	19·84	·05
Wa. 10411. Kon.−·5	7·2	24 40·90	2·926	·021	52 53 41·2	19·87	·05
1 Gr. 2111. 1 R. .	6	24 40·09	2·911	·021	50 27 8·4	19·86	·06
Ko. 590. L. . .	6·2	23 24 47·49	2·924	·021	52 40 4·5	19·86	·05
1 H. 11381. Ko.+·5	8	25 46·95	2·920	·023	50 38 59·4	19·88	·04
K. 655. . .	8	27 23·89	2·937	·021	52 56 56·8	19·89	·04
Ko. 689. L. . .	8	28 39·37	2·937	·022	51 38 48·8	19·91	·04
Ko. 716. L.−·6 .	6·5	30 0·02	2·949	·021	53 2 11·4	19·92	·04
K. 751. L.+·6 .	7	23 31 27·40	2·943	·023	50 8 4·6	19·94	·04
Ko. 805. L.−1·3 .	8	33 41·19	2·965	·022	52 46 45·8	19·96	·04
K. 934. L.−2·4 .	6·8	41 6·68	2·991	·025	50 29 37·1	20·01	·02
Dorp. 2853. L.* .	7	41 42·25	3·000	·023	52 48 1·4	20·01	·02
1 Rad. 6211. W. .	6·8	43 50·63	3·006	·024	51 24 50·4	20·03	·02

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Authority and Star's Name	Mag.	IN MEAN SOLAR TIME Right Ascension h. m. s.	Ann. Var. + s.	Sec. Var. + s.	North Polar Distance ° ′ ″	Ann. Var. − ″	Sec. Var. − ″
K. 1002. W. .	8	23 44 50·26	3·013	·023	52 37 33·6	20·02	·01
K. 1035. . .	7·9	46 47·83	3·019	·026	50 5 34·6	20·03	·01
1 Ra. 6233. K. .	7·6	48 6·77	3·027	·025	51 43 52·8	20·04	·0
1 Ra. 6242. G. .	7·3	48 36·62	3·029	·025	51 35 0·3	20·04	·0
K. 1094. . .	7·5	49 22·29	3·034	·024	52 53 45·9	20·04	·0
1 Ra. 6252. G. .	6·6	23 49 43·88	3·034	·025	51 50 10·5	20·04	·0
6 B. 4912. W. .	6·3	49 55·42	3·036	·025	52 23 29·1	20·05	·0
Ko. 1195. . .	8	52 42·88	3·047	·026	50 42 3·4	20·05	·0
L. 47210. . .	8	54 28·96	3·056	·025	51 54 37·7	20·05	·0
1 Ham. 11962. K.	6·7	55 42·63	3·062	·027	50 16 40·2	20·06	+ ·01
K. 1312. L. . .	8	23 56 26·73	3·065	·025	52 4 15·0	20·06	+ ·01
1 Rad. 6316. G. .	7·3	57 14·29	3·069	·027	50 37 0·6	20·05	·01
1 Ra. 6317. G. .	6·8	57 15·33	3·069	·027	50 32 49·4	20·05	·01
K. 1343. L. . .	8	57 18·89	3·070	·026	51 39 32·8	20·06	·01
K. 1351. L. . .	8	57 28·14	3·070	·025	51 58 25·8	20·06	·01
Ko. 1378. L.−·3 .	7·8	23 58 28·22	3·075	·027	50 12 4·0	20·06	·01
1 H. 1. . .	8	58 30·16	3·076	·027	50 3 59·5	20·06	·01

Ko. 414. preceded by smaller to the south, dif. 4·56 sec.
Dorp. 2853. Dup. **7**−4″−**7**−89° the mean.

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Some of the stars in Table IV. have had PROPER MOTIONS assigned to them in the Catalogues from which their places have been taken. In the following cases these proper motions have been replaced by others which have been adopted in constructing Table IV. Table V. shows the alterations which have been made.

In the last column, Main, Stone, and 7 B. indicate that the P.M. adopted has been taken either from the well-known Papers of the Rev. Robert Main or of Mr. Stone in the Memoirs of the Royal Astronomical Society, or from a list of P.M.s in 7 B. B.F. indicates that the P.M. depends upon a comparison of the star's place given in the recent Catalogue with its place in the Fundamenta. In the other cases the P.M. represents my opinion of what is probable after referring to the works mentioned in the last column. A semicolon separates the authority for the P.M. in R.A. from the authority for that in N.P.D.

TABLE V.

STAR	Mag.	R.A. in Table IV.		PROPER MOTIONS in Original Catalogue		PROPER MOTIONS Adopted in Table IV.		Authority or Books referred to
		h.	m.	in R.A. sec.	in N.P.D. "	in R.A. sec.	in N.P.D. "	
4 Gree. 23. Andromedæ ρ	6	0	14	+·008	+·02	+·004	+·06	B.F.
4 Gr. 71. Andromedæ 32	5	0	34	+·012	−·02	·0	·0	B.F.
4 Gr. 152. Androm. 45	6	1	3	−·039	−·06	−·002	·0	B.F.
4 Gre. 188. Androm. 47	6	1	16	+·010	−·02	+·005	+·02	B.F.
4 Gre. 227. Androm. τ	5	1	32	+·011	+·09	+·004	+·06	B.F.
4 Gre. 234. P.I. 170 .	6	1	40	+·010	−·01	+·005	·0	P. and 7 B.
4 Gre. 278. Androm. 58	5	2	0	+·016	+·03	+·010	+·06	B.F.
4 Gre. 282. Androm. 59	7	2	2	−·001	+·01	−·003	+·03	B.F.
4 Gre. 283. Brad. 294 .	7·5	2	2	+·001	—	−·002	+·02	4 G. 282. & Σ.
4 Gr. 368. Persei 20 .	6	2	45	+·006	+·07	+·004	+·08	B.F.
4 Gre. 399. Persei ω .	5	3	2	+·002	−·02	−·002	−·01	B.F.
4 Gr. 451. P. III. 104 .	6	3	32	+·025	−·07	−·002	·0	P. 7 B. A.
4 Gr. 515. Persei 49 .	6·7	3	59	−·005	+·14	−·009	+·16	B.F.
4 Gre. 516. Persei 50 .	6	3	59	+·019	+·20	+·014	+·20	B.F.
4 Gre. 601. Aurigæ 1 .	6	4	40	−·002	−·06	−·004	−·03	B.F.
4 Gre. 627. Aurigæ 4 .	6	4	49	+·005	+·09	+·003	+·11	B.F.
4 Gre. 628. Aurigæ 5 .	6	4	50	+·004	·0	−·003	·0	B.F.
4 Gr. 629. Aurigæ 6 .	6·7	4	50	+·003	+·03	−·001	+·02	B.F.
4 Gre. 656. Aurigæ μ .	6·5	5	4	·0	+·06	−·002	+·08	B.F.
4 Gre. 677. Aurigæ σ .	6	5	15	+·005	·0	·0	+·02	B.F.
4 Gr. 744. Aurigæ 28 .	6·7	5	39	+·003	−·07	−·002	+·03	B.F.
4 Gr. 746. Aurigæ τ .	5	5	39	·0	+·06	−·003	+·05	B.F.
4 Gr. 751. Aurigæ υ .	5	5	41	+·006	+·03	+·001	+·04	B.F.
4 G. 753. Aurigæ ν .	4	5	41	+·003	−·03	−·003	−·02	B.F.
4 Gr. 781. Aurigæ 40 .	6	5	56	+·001	—	·0	—	B.F.
4 G. 846. Aurigæ 51 .	5·6	6	28	−·002	+·11	−·003	+·11	B.F.
4 G. 871. Aurigæ 59 .	6	6	43	+·011	+·02	+·003	−·01	PGD. 1R; B.F.
4 G. 872. Aurigæ 61 .	6	6	44	+·009	+·01	·0	·0	P.G. 1 R.; B.F.
4 Gre. 1208. Leo Min. 17	7	9	43	−·003	·0	−·007	+·01	B.F.
4 Gr. 1275. Leo Min. 32	6	10	21	+·003	+·02	−·002	·0	B.F.

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STAR	Mag.	R.A. in Table IV. h.	m.	PROPER MOTIONS in Original Catalogue in R.A. sec.	in N.P.D. ″	Adopted in Table IV. in R.A. sec.	in N.P.D. ″	AUTHORITY OR BOOKS REFERRED TO
4 Gre. 1291. Leo Min. 38	6	10	30	−·021	+·03	−·021	+·04	B.F.
4 Gre. 1335. Ursæ Ma. 49	5	10	52	−·002	+·02	−·007	+·01	B.F.
4 Gr. 1347. Ursæ Ma. 51	6	10	55	−·003	+·06	−·008	+·03	B.F.
4 Gre. 1381. Ursæ Ma. 57	5	11	20	−·001	+·01	−·006	−·01	B.F.
4 Gr. 1552. Can. Ven. 15	5	13	1	+·002	+·02	·0	−·01	B.F.
4 Gr. 1553. Can. Ven. 16	7	13	2	−·007	−·01	−·009	−·01	B.F.
4 Gre. 1554. Can. Ven. 17	5	13	2	−·005	−·04	−·007	−·04	B.F.
4 Gre. 1685. G. 2154 .	6	14	45	—	—	−·020	−·09	7 B.
4 Gree. 1737. Bootis μ .	4·3	15	17	−·014	−·09	−·013	−·09	B.F.
4 Gre. 1796. Cor. Bor. λ	6·5	15	48	+·004	−·09	+·004	−·10	B.F.
4 Gr. 1949. Bradley 2208	6·7	17	17	−·010	—	−·002	—	B.F.
4 Gr. 2034. Lyræ μ .	5·6	18	17	−·003	·0	−·003	+·01	B.F.
4 Gre. 2052. P. xviii. 160	6	18	32	+·015	+·06	+·003	·0	P.G. 1 R.
4 Gr. 2193. Bradley 2529	6	19	41	+·003	+·12	+·001	—	B.F.
4 Gr. 2218. Cygni 22 .	5·6	19	48	+·002	·0	−·001	·0	B.F.
4 Gre. 2274. Bradley 2613	5·6	20	9	+·015	—	·0	·0	B.F.; G. 1 R.A.
4 Gr. 2277. Cygni 34 .	5	20	9	+·001	−·03	−·001	+·01	B.F.
4 Gr. 2302. Cygni 40 .	6	20	19	−·001	+·04	−·003	+·04	B.F.
4 Gr. 2385. Bradley 2740	6·7	20	54	·0	+·02	·0	·0	B.F.; P.G. 1 R.
4 Gre. 2450. Cygni 72 .	5	21	26	+·013	−·12	+·010	−·10	B.F.
4 Gr. 2455. Cygni 74 .	5	21	28	+·001	−·01	−·002	−·01	B.F.
4 Gr. 2588. Bradley 2981	6·6	22	26	−·001	+·27	·0	+·01	4 G. 2589. & Σ.
4 Gr. 2589. Lacertæ 8 .	6·1	22	26	−·002	+·02	−·001	+·02	B.F.
4 Gre. 2595. Lacertæ 10	5	22	29	−·001	−·02	−·001	+·01	B.F.
4 Gr 2675 Andromedæ 12	6	23	11	+·015	+·05	+·009	+·07	B.F.
4 Gr 2692 Andromedæ 14	6	23	21	+·026	+·05	+·022	+·09	B.F.
3 Gre. 199. Persei ρ .	4	2	56	+·013	+·13	+·010	+·11	Stone
3 Gre. 689. P. viii. 245	5	8	57	+·007	+·06	·0	·0	P.G.
3 Gr. 1085. P. xiii. 136	5	13	27	+·011	+·09	+·005	+·01	7 B.
3 Gre. 1190. Bootis 40	5	14	52	−·003	−·03	−·002	−·06	G. 1 R.; Stone
3 Gr. 1244. Cor. Bor. ζ 1	6*	15	32	+·013	+·10	·0	·0	3 G. 1245. & Σ.
3 Gr. 1245. Cor. Bor. ζ 2	4*	15	32	+·013	+·10	·0	·0	P.D.
3 Gre. 1552. Lyræ η .	4·5	19	6	+·002	−·05	·0	−·02	Stone
3 Gr. 1599. Cygni 15 .	5·6	19	36	+·010	−·08	+·006	−·04	Stone
3 Gr. 1760. Cygni σ .	4·5	21	9	+·003	+·01	·0	+·03	Stone
3 Gre. 1859. P. xxii. 36	5	22	4	+·013	+·16	+·007	·0	P.G.L.
3 Gr. 1861. Lacertæ 1 .	5·4	22	6	+·002	−·02	−·001	·0	Stone
The Mags. transposed in 3 G.								
2 Gre. 17. Andromedæ θ	5·4	0	10	−·002	+·01	−·008	+·03	Main
2 Gree. 664. Lyncis 38	4	9	9	−·001	+·04	−·007	+·06	B.F.
2 Gree. 903. Bootis γ .	3·2	14	24	+·002	−·14	−·006	−·16	B.F.
2 Gre. 1123–4. Herculis ρ	4	17	16	+·004	−·02	−·002	−·02	Main
2 Gr. 1161. Herculis θ .	4	17	49	+·001	−·05	−·003	−·02	Main
2 Gree. 1315 Cygni γ .	3·2	20	14	+·003	−·02	·0	−·02	Main

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STAR	Mag.	R.A. in Table IV. h.	R.A. in Table IV. m.	PROPER MOTIONS in Original Catalogue in R.A. sec.	PROPER MOTIONS in Original Catalogue in N.P.D. "	PROPER MOTIONS Adopted in Table IV. in R.A. sec.	PROPER MOTIONS Adopted in Table IV. in N.P.D. "	AUTHORITY OR BOOKS REFERRED TO
1 Gre. 250. Persei π .	5	2	50	+·005	+·03	+·002	+·04	B.F.
1 Gre. 336. Persei 45 .	3·4	3	48	·0	+·03	−·003	+·04	Main
1 Gr. 1009. Can. Ven. 6	5·6	12	17	−·003	+·09	−·006	+·04	Main
1 Gr. 1630. Bradley 2339	7	18	28	−·006	+·07	−·001	—	B.F.
1 Gre. 1936. Cygni 79 .	5·6	21	34	+·004	—	−·001	—	Main
1 Gr 2111 Andromedæ 15	6	23	24	+·002	+·03	−·002	−·04	B.F.
1 Rad. 1624 . .	6·4	5	55	−·003	+·08	·0	—	K.M.
1 Ra. 1634 . .	6·8	5	57	+·004	+·06	·0	—	L.M.W.
1 Rad. 2164 . .	6·3	8	23	—	—	−·014	+·21	7 B.
1 Rad. 2434 . .	7·0	9	14	—	—	−·011	+·15	7 B.
1 Rad. 3060 . .	7·8	13	30	—	—	−·018	+·13	7 B.
1 Rad. 3265 . .	6·2	14	41	—	—	−·021	−·12	7 B.
1 Rad. 3495 . .	7	15	58	—	—	−·042	—	G.K.L.
1 Ra. 4098 . .	7·1	18	44	—	—	+·030	—	G.L.
1 Rad. 4519 . .	6·9	19	49	+·010	+·05	·0	·0	P.A.
1 Ra. 5316 . .	6·8	21	29	+·016	—	·0	—	G.W.
Wa. 8995 . . .	7·3	20	30	—	—	+·015	—	D30. D51. KL.
Wa. 9196 . . .	6	20	51	—	—	+·024	—	G. and 1 R.
6 B. 4560 . . .	6·7	22	14	—	—	+·029	−·11	7 B.

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SECULAR VARIATIONS OF PRECESSIONS IN RIGHT ASCENSION AND DECLINATION.

Right Ascension.		In R. A. given in Seconds of Time.					In Dec. given in Seconds of Arc.				
		Dif. for 10 m. R. A.	Sec. Var. for Dec. 36°	Dif. for 1° Dec.	Sec. Var. for Dec. 41°	Dif. for 10 m. R. A.	Dif. for 10 m. R. A.	Sec. Var. for Dec. 36°	Dif. for 1° Dec.	Sec. Var. for Dec. 41°	Dif. for 10 m. R. A.
h.	m.		+		+			−		−	
0	0		·0241	8,8	·0285			·014	0	·014	
0	10	11	0252	9,4	·0299	14	20	·034	0	·034	20
0	20	11	·0263	9,8	·0312	13	20	·054	0	·054	20
0	30	10	·0273	10,2	·0324	12	21	·075	0	·075	21
0	40	10	·0283	10,6	·0336	12	21	·096	0,2	·097	22
0	50	9	·0292	11,0	·0347	11	22	·118	0,4	·120	23
1	0	7	·0299	11,4	·0356	9	22	·140	0,6	·143	23
1	10	7	·0306	11,6	·0364	8	22	·162	0,8	·166	23
1	20	5	·0311	12,0	·0371	7	22	·184	1,0	·189	23
1	30	5	·0316	12,2	·0377	6	22	·206	1,2	·212	23
1	40	4	·0320	12,2	·0381	4	22	·228	1,4	·235	23
1	50	2	·0322	12,4	·0384	3	22	·250	1,6	·258	23
2	0	1	·0323	12,6	·0385	2	23	·273	1,6	·281	23
2	10	1	·0322	12,6	·0385	1	22	·295	2,0	·305	24
2	20	1	·0321	12,6	0384	1	22	·317	2,2	·328	23
2	30	3	·0318	12,6	·0381	3	22	·339	2,4	·351	23
2	40	3	·0315	12,2	·0376	5	21	·360	2,6	·373	22
2	50	6	·0309	12,2	·0370	6	20	·380	2,8	·394	21
3	0	6	·0303	11,8	·0362	8	20	·400	3,0	·415	21
3	10	8	·0295	11,4	·0352	10	19	·419	3,2	·435	20
3	20	9	·0286	11,0	·0341	11	19	·438	3,4	·455	20
3	30	11	·0275	10,6	·0328	13	18	·456	3,6	·474	19
3	40	12	·0263	10,2	·0314	14	17	·473	3,8	·492	18
3	50	13	·0250	9,6	·0298	16	16	·489	4,0	·509	17
4	0	14	·0236	9,0	·0281	17	15	·504	4,2	·525	16
4	10	15	·0221	8,4	·0263	18	14	·518	4,4	·540	15
4	20	16	·0205	7,8	·0244	19	13	·531	4,6	·554	14
4	30	17	·0188	7,2	·0224	20	11	·542	5,0	·567	13
4	40	18	·0170	6,4	·0202	22	11	·553	5,0	·578	11
4	50	19	·0151	5,6	·0179	23	9	·562	5,2	·588	10
5	0	20	·0131	4,8	·0155	24	8	·570	5,2	·596	8
5	10	20	·0111	4,0	·0131	24	7	·577	5,2	·603	7
5	20	20	·0091	3,0	·0106	25	5	·582	5,4	·609	6
5	30	20	·0071	2,0	·0081	25	4	·586	5,4	·613	4
5	40	21	·0050	1,2	·0056	25	2	·588	5,6	·616	3
5	50	21	·0029	0,2	·0030	26	1	·589	5,6	·617	1
6	0	22	·0007	0,6	·0004	26	0	·589	5,6	·617	0
			+		+			−		−	

The last Decimal in the Sec. Vars may be slightly incorrect.

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SECULAR VARIATIONS OF PRECESSIONS IN RIGHT ASCENSION AND DECLINATION.

Right Ascension.		In R. A. given in Seconds of Time.					In Dec. given in Seconds of Arc.				
		Dif. for 10 m	Sec. Var. for Dec.	Dif. for 1°	Sec. Var. for Dec.	Dif. for 10 m.	Dif. for 10 m.	Sec. Var. for Dec.	Dif. for 1°	Sec. Var. for Dec.	Dif. for 10 m.
h.	m.	R. A.	36°	Dec.	41°	R. A.	R. A.	36°	Dec.	41°	R. A.
6	0	21	·0007	0,6	·0004	25	1	·589	5,6	·617	1
			+		+			—		—	
			—		—			—		—	
6	10	20	·0014	1,4	·0021	25	3	·588	5,6	·616	3
6	20	21	·0034	2,4	·0046	25	5	·585	5,6	·613	5
6	30	20	·0055	3,2	·0071	25	6	·580	5,6	·608	7
6	40	20	·0075	4,2	·0096	24	7	·574	5,4	·601	7
6	50	20	·0095	5,0	·0120	23	8	·567	5,4	·594	9
7	0	18	·0115	5,6	·0143	23	9	·559	5,2	·585	10
7	10	18	·0133	6,6	·0166	21	11	·550	5,0	·575	12
7	20	16	·0151	7,2	·0187	20	12	·539	4,8	·563	12
7	30	16	·0167	8,0	·0207	19	13	·527	4,8	·551	14
7	40	15	·0183	8,6	·0226	18	14	·514	4,6	·537	15
7	50	14	·0198	9,2	·0244	17	15	·500	4,4	·522	17
8	0	13	·0212	9,8	·0261	16	17	·485	4,0	·505	18
8	10	12	0225	10,4	·0277	14	17	·468	3,8	·487	18
8	20	10	·0237	10,8	·0291	12	18	·451	3,6	·469	19
8	30	9	·0247	11,2	·0303	11	19	·433	3,4	·450	20
8	40	8	·0256	11,6	·0314	9	19	·414	3,2	·430	21
8	50	7	·0264	11,8	·0323	8	20	·395	2,8	·409	21
9	0	6	·0271	12,0	·0331	7	21	·375	2,6	·388	22
9	10	4	·0277	12,2	·0338	5	21	·354	2,4	·366	22
9	20	2	·0281	12,4	·0343	3	21	·333	2,2	·344	23
9	30	2	·0283	12,6	·0346	1	22	·312	1,8	·321	23
9	40	1	·0285	12,4	·0347	0	23	·290	1,6	·298	23
9	50	1	·0284	12,6	·0347	1	22	·267	1,6	·275	24
10	0	2	·0283	12,6	·0346	3	22	·245	1,2	·251	23
10	10	3	·0281	12,4	·0343	4	23	·223	1,0	·228	23
10	20	4	·0278	12,2	·0339	5	23	·200	1,0	·205	24
10	30	6	·0274	12,0	0334	7	23	·177	0,8	·181	23
10	40	7	·0268	11,8	·0327	9	22	·154	0,8	·158	23
10	50	7	·0261	11,4	·0318	9	21	·132	0,6	·135	23
11	0	9	·0254	11,0	·0309	10	22	·111	0,2	·112	22
11	10	9	·0245	10,8	·0299	11	21	·089	0,2	·090	22
11	20	10	·0236	10,4	·0288	12	21	·068	0	·068	21
11	30	10	·0226	10,0	·0276	13	21	·047	0	·047	21
11	40	11	·0216	9,4	·0263	14	20	·026	0	·026	20
11	50	12	·0205	8,8	·0249	14	20	·006	0	·006	20
			—		—			—		—	
			—		—			+		+	
12	0		·0193	8,4	·0235			·014	0	0·14	

The last Decimal in the Sec. Vars. may be slightly incorrect.

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SECULAR VARIATIONS OF PRECESSIONS IN RIGHT ASCENSION AND DECLINATION.

Right Ascension. h.	m.	In R. A. given in Seconds of Time. Dif. for 10 m. R. A.	Sec. Var. for Dec. 36°	Dif. for 1° Dec.	Sec. Var. for Dec. 41°	Dif. for 10 m. R. A.	In Dec. given in Seconds of Arc. Dif. for 10 m. R. A.	Sec. Var. for Dec. 36°	Dif. for 1° Dec.	Sec. Var. for Dec. 41°	Dif. for 10 m. R. A.
			−		−			+		+	
12	0	12	·0193	8,4	·0235	15	19	·014	0	·014	19
12	10	12	·0181	7,8	·0220	15	18	·033	0	·033	18
12	20	12	·0169	7,2	·0205	15	18	·051	0	·051	17
12	30	13	·0157	6,6	·0190	15	17	·069	0,2	·068	17
12	40	13	·0144	6,2	·0175	16	17	·086	0,2	·085	16
12	50	12	·0131	5,6	·0159	15	16	·103	0,4	·101	16
13	0	13	·0119	5,0	·0144	15	15	·119	0,4	·117	14
13	10	12	·0106	4,6	·0129	14	15	·134	0,6	·131	14
13	20	12	·0094	4,2	·0115	15	13	·149	0,8	·145	13
13	30	11	·0082	3,6	·0100	14	13	·162	0,8	·158	12
13	40	12	·0071	3,0	·0086	14	12	·175	1,0	·170	11
13	50	11	·0059	2,6	·0072	13	12	·187	1,2	·181	11
14	0	10	·0048	2,2	·0059	12	11	·199	1,4	·192	10
14	10	10	·0038	1,8	·0047	12	10	·210	1,6	·202	9
14	20	9	·0028	1,4	·0035	12	9	·220	1,8	·211	8
14	30	8	·0019	0,8	·0023	10	9	·229	2,0	·219	8
14	40	7	·0011	0,4	·0013	8	8	·238	2,2	·227	7
14	50	7	·0004	0,2	·0005	8	8	·246	2,4	·234	6
			−		−			+		+	
			+		+			+		+	
15	0	6	·0003	0	·0003	7	7	·254	2,8	·240	6
15	10	6	·0009	0,2	·0010	7	7	·261	3,0	·246	5
15	20	5	·0015	0,4	·0017	6	6	·268	3,4	·251	5
15	30	4	·0020	0,6	·0023	5	6	·274	3,6	·256	4
15	40	3	·0024	0,8	·0028	4	5	·279	3,8	·260	3
15	50	3	·0027	1,0	·0032	3	4	·283	4,0	·263	3
16	0	2	·0030	1,0	·0035	2	4	·287	4,2	·266	3
16	10	1	·0032	1,0	·0037	2	4	·291	4,4	·269	2
16	20	1	·0033	1,2	·0039	1	3	·294	4,6	·271	
16	30	0	·0034	1,2	·0040	0	3	·297	4,8	·273	2
16	40	0	·0034	1,2	·0040	1	3	·300	5,0	·275	2
16	50	1	·0034	1,0	·0039	1	2	·302	5,2	·276	1
17	0	0	·0033	1,0	·0038	2	1	·303	5,2	·277	1
17	10	2	·0033	0,6	·0036	2	2	·305	5,4	·278	1
17	20	2	·0031	0,6	·0034	3	1	·306	5,4	·279	0
17	30	2	·0029	0,4	·0031	2	1	·307	5,6	·279	0
17	40	2	·0027	0,4	·0029	3	0	·307	5,6	·279	0
17	50	2	·0025	0,2	·0026	3	0	·307	5,6	·279	0
18	0		·0023	0	·0023		1	·306	5,4	·279	
			+		+			+		+	

The last Decimal in the Sec. Vars. may be slightly incorrect.

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SECULAR VARIATIONS OF PRECESSIONS IN RIGHT ASCENSION AND DECLINATION.

Right Ascension. h.	m.	In R. A. given in Seconds of Time. Dif. for 10 m. R. A.	Sec. Var. for Dec. 36°	Dif. for 1° Dec.	Sec. Var. for Dec. 41°	Dif. for 10 m. R. A.	In Dec. given in Seconds of Arc. Dif. for 10 m. R. A.	Sec. Var. for Dec. 36°	Dif. for 1° Dec.	Sec. Var. for Dec. 41°	Dif. for 10 m R. A.
			+		+			+		+	
18	0		·0023		·0023		0	·306	5,4	·279	
		2				3					0
18	10		·0021	0,2	·0020		1	·306	5,4	·279	
		2				3					1
18	20		·0019	0,4	·0017		1	·305	5	·278	
		2				2					1
18	30		·0017	0,4	·0015		2	·304	5,4	·277	
		2				2					2
18	40		·0015	0,4	·0013		2	·302	5,4	·275	
		1				2					1
18	50		·0014	0,6	·0011		2	·300	5,2	·274	
		1				2					2
19	0		·0013	0,8	·0009		3	·298	5,2	·272	
		1				1					2
19	10		·0012	0,8	·0008		3	·295	5,0	·270	
		0				1					3
19	20		·0012	1,0	·0007		3	·292	5,0	·267	
		1				1					2
19	30		·0013	1,0	·0008		4	·289	4,8	·265	
		0				0					3
19	40		·0013	1,0	·0008		4	·285	4,6	·262	
		1				2					3
19	50		·0014	0,8	·0010		5	·281	4,4	·259	
		2				2					4
20	0		·0016	0,8	·0012		5	·276	4,2	·255	
		3				3					4
20	10		·0019	0,8	·0015		6	·271	4,0	·251	
		3				4					4
20	20		·0022	0,6	·0019		6	·265	3,6	·247	
		4				6					5
20	30		·0026	0,2	·0025		7	·259	3,4	·242	
		5				6					6
20	40		·0031	0	·0031		7	·252	3,2	·236	
		6				7					6
20	50		·0037	0,2	·0038		8	·245	3,0	·230	
		7				7					6
21	0		·0044	0,2	·0045		8	·237	2,6	·224	
		7				9					7
21	10		·0051	0,6	·0054		9	·229	2,4	·217	
		8				9					8
21	20		·0059	0,8	·0063		9	·220	2,2	·209	
		8				10					8
21	30		·0067	1,2	·0073		10	·211	2,0	·201	
		9				11					9
21	40		·0076	1,6	·0084		11	·201	1,8	·192	
		10				12					10
21	50		·0086	2,0	·0096		12	·190	1,6	·182	
		10				13					10
22	0		·0096	2,6	·0109		12	·178	1,2	·172	
		11				13					12
22	10		·0107	3,0	·0122		13	·166	1,2	·160	
		11				13					12
22	20		·0118	3,4	·0135		14	·153	1,0	·148	
		12				14					13
22	30		·0130	3,8	·0149		14	·139	0,8	·135	
		13				15					14
22	40		·0143	4,2	·0164		15	·125	0,8	·121	
		13				15					14
22	50		·0156	4,6	·0179		16	·110	0,6	·107	
		12				15					15
23	0		·0168	5,2	·0194		16	.094	0,4	·092	
		12				16					16
23	10		·0180	6,0	·0210		17	·078	0,4	·076	
		12				15					16
23	20		·0192	6,6	·0225		18	·061	0,2	·060	
		13				16					18
23	30		·0205	7,2	·0241		18	·043	0,2	.042	
		12				15					18
23	40		·0217	7,8	·0256		19	·025	0,2	·024	
		12				15					19
23	50		·0229	8,4	·0271		20	·006	0,2	·005	
		12				14					19
			+		+			+		+	
			+		+			−		−	
24	0		·0241	8,8	·0285			·014	0	·014	

The last Decimal in the Sec. Vars. may be slightly incorrect.

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An imaginary point in the heavens, the Mean Equinox, may be said to revolve round the earth at an uniform rate, passing the meridian at intervals of 23 h. 56 m. 4·09054980 6 sec. (Shortrede's table, where the length of an equinoctial day is given in seconds of mean solar time).

The fixed stars also pass the meridian in the order of their Right Ascensions. The Right Ascension of a star generally expresses the interval of time between the transit of the equinox and that of the star. Astronomers have at different times observed, and determined with great accuracy, the Right Ascensions of a great number of stars, and also their Declinations, or angular distances from the equator.

These Right Ascensions are not fixed quantities, since each star, according to its position in the heavens, is subject to noticeable variations in its Right Ascension.

These variations may be conveniently arranged in three classes:

1st. With respect to the stars included in Table IV., there is a continual increase in their Right Ascensions, of from 2 to 4 seconds a year—'Precession.'

2nd. There is a slight fluctuation extending over a period of 18·6 years; the star during that time gaining and losing upon its mean place—'Lunar Nutation.'

3rd. There are two fluctuations apparent during the year—'Aberration' and 'Solar Nutation.'

The laws which govern all these movements have been discovered by astronomers, and the movements can be calculated with the greatest certainty; so that for many years to come the time at which a star will apparently pass the meridian on any given day can be predicted to less than a second.

The Tables in this book are intended to enable the observer to calculate with very little trouble, and with slight chance of error, the mean solar time of the apparent transits across the meridian, of the stars included in the list. It will be sufficient to show that the Tables are founded upon, and are in accordance with, formulæ adopted by the highest authorities.

Table I. has been found by the repeated addition of 23 h. 56 m. 4·09055 sec., the length of an equinoctial day, to 5 h. 13 m. 28 sec., the time opposite Jan. 1.

If, then, the transit of the equinox took place on that day at 5 h. 13m. 28 sec., the Table would give the time of its transit on all the remaining days in the year. But the equinox does not pass the meridian of Greenwich so soon as that, on Jan. 1 in any year mentioned in Table III. Table I. will consequently require a correction for Jan. 1, and the remaining days in the same year will require the same correction.

Table I*a*. gives for each year there mentioned the required correction. The amount of the correction has been deduced from Le Verrier's tables in 'Annales de l'Observatoire Imperial de Paris,' tome 4; one of which gives the sun's mean longitude at Paris noon for Jan. 1 for the years down to 1900. Now 360°— sun's mean longitude, when reduced from arc to mean solar time, and diminished by 1·531 sec. to adapt it to the meridian of Greenwich, has been taken as the mean solar time of the transit of the mean equinox at Greenwich; and that time, less the 5 h. 13 m. 28 sec. found in Table I., constitutes the equinox correction for each year down to 1900, and is given in Table I*a*. The corrections for the years following 1900 have been found by adopting as the equinox correction for that year 2 m. 57·6002 sec., and increasing the correction for each succeeding year by successive additions of 57·1372 sec.; excepting in the case of the years following leap years, for which the equinox corrections have been taken as less than those for the leap years by 2 m. 58·7722 sec.

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Adding together, then, the tabular results from Tables I. and I*a*., we get the mean solar time of the transit at Greenwich of the mean equinox; but as the equinoctial day is shorter than the mean solar day by 3 m. 55·90945 sec., it follows that the mean equinox is continually gaining upon the mean sun, which regulates the mean solar time (see first page in the 'Explanation' in the *Nautical Almanac*), and thus, in places to the west of Greenwich, where the *local* mean noon is later than the mean noon at Greenwich, the transit of the mean equinox will take place earlier, according to *local* mean time, than it did at Greenwich according to Greenwich mean time; and similarly it will take place later at places east of Greenwich.

This gain of the mean equinox upon the mean sun is in proportion to the longitude of the place, and, of course, does not alter. Table I*b*. gives for degrees of longitude the first 10 multiples of 3 m. 55·90945 s. ÷ 360, and also proportional parts for minutes of longitude. This will readily give the acceleration or retardation due to any terrestrial longitude west or east up to 180°, where the day may be said to change. For places east of Greenwich the tabular result from Table I*b*. should be added to the equinox correction in Table I*a*., and for places west subtracted.

Having now pointed out how the mean time of the transit of the mean equinox is to be found by Tables I., I*a*., and I*b*., it remains to show how long after it the fixed stars appear to pass the meridian.

The following is copied from the *Nautical Almanac* for 1866:—

FORMULÆ OF REDUCTION, ACCORDING TO THE LATE PROFESSOR BESSEL.

1.—*Adopting the Notation of the British Association Catalogue and the Coefficients of Professor Peters* (*Numerus Constans Nutationis*, *p.* 75).

$$A = -20''\cdot4451 \cos\omega \cos\odot$$

$$B = -20''\cdot4451 \sin\odot$$

$$C = t - 0^{s}\cdot02519 \sin 2\odot - 0''\cdot34241 \sin\Omega + 0''\cdot00410 \sin 2\Omega - 0''\cdot00405 \sin 2\mathbb{C}$$

$$D = -0''\cdot5507 \cos 2\odot - 9''\cdot2237 \cos\Omega + 0''\cdot0895 \cos 2\Omega - 0''\cdot0885 \cos 2\mathbb{C}$$

$$a = \cos\alpha \sec\delta$$

$$b = \sin\alpha \sec\delta$$

$$c = 46''\cdot0811 + 20''\cdot0550 \sin\alpha \tan\delta$$

$$d = \cos\alpha \tan\delta$$

$$a' = \tan\omega \cos\delta - \sin\alpha \sin\delta$$

$$b' = \cos\alpha \sin\delta$$

$$c' = 20''\cdot0550 \cos\alpha$$

$$d' = -\sin\alpha$$

Δc = the annual proper motion in Right Ascension, in *arc*.

$\Delta c'$ = the annual proper motion in Declination.

Where t denotes the time reckoned from the moment when the Sun's mean longitude was 280° (Jan. $0^{d}\cdot081$) and expressed in fractional parts of a tropical year, $\odot$ the Sun's and $\mathbb{C}$ the Moon's true longitude, Ω the mean longitude of the Moon's node and ω the obliquity of the Ecliptic, each for the time t: α the mean Right Ascension, *in arc*, and δ the mean Declination for the beginning of the year. Then, for the time represented by t,

$$\text{Apparent R.A., } in\ arc, = \alpha + A\alpha + Bb + Cc + Dd + t\Delta c.$$

$$\text{Apparent Dec. - - - } = \delta + Aa' + Bb' + Cc' + Dd' + t\Delta c'.$$

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Now the apparent declination of a star is the angular distance it appears to be from the celestial plane, which for the time being is that of the earth's equator; or, as that celestial plane is called, the *true* equator. Similarly, the apparent Right Ascension is the angle which the meridian in which the star seems to be, makes with the meridian of the *true* equinox. Or, if the angle be reduced to sidereal time, the apparent R.A. is the sidereal time the star appears to pass the meridian after the *true* equinox.

Postponing for the present the consideration of α and δ, and beginning with $A\,a$, $B\,b$, $C\,c$, $D\,d$, it may be noticed that a, b, c, and d refer to particular points in the heavens: the values of these have been calculated for Declination 38° 40′ = N.P.D. 51° 20′, and every 15° or sidereal hour of Right Ascension.

An inspection of the values of A, B, C, and D will show that they are made up of quantities which are readily divisible into the following three classes: 1st, those which depend upon the Sun's longitude and the time of the year, and which will consequently be much the same for one year as for another, which call A, B, C′, and D′; 2nd, those which depend upon the longitude of the Moon's node, which call C″ and D″; 3rd, those which are very small, and may be entirely neglected (see explanation, in *Nautical Almanac*, of Bessel's day numbers), as may also $t\,\Delta\,c$, which is generally very small, and only applies to individual stars.

Inspection will also shew that in $C'\,c$ there is a quantity

$$-\cdot02519 \sin 2\,\odot \times 46''\cdot0811,$$

and in $C''\,c$ there is another

$$(\cdot0041 \sin 2\,\Omega - \cdot34241 \sin \Omega) \times 46''\cdot0811.$$

These quantities, which are common to all stars, serve to refer the stars from the mean to the true equinox; and as Tables I., I*a*., and I*b*. give the time of the transit of the mean, and net of the true equinox, these two quantities must be removed. Removing these, and omitting the small quantities in Class 3, $A\,a + B\,b + C'\,c + D'\,d$, have been computed for every tenth night in the year (1866), and combined with + 10 seconds to render the sum always additive, and the result is given in Table II., where it is expressed in sidereal time instead of arc.

$C''\,c + D''d$ have been computed for Jan. 1 of each of the years mentioned in Table III., and combined with + 1 second to render them all additive, and the result is given in Table III., where it is expressed in sidereal time instead of arc. Since this fluctuation has a 'period' of 18·6 years, the same tabular result will serve at the expiration of that time. The date of that recurrence is given in column 4 of Table III.

It thus appears that, by adding the tabular results from Tables II. and III., and subtracting the 11 seconds, much the same quantity is obtained as would be arrived at by working out the values of $A\,a + B\,b + C\,c + D\,d$, with the exception of that part which refers the star's place from the *mean* to the *true* equinox. It follows that if a star were situated in one of the fixed points for which a, b, c, and d have been calculated,

a, expressed in sidereal time, + the tabular results from T. II. & III. − 11 sec., would give its apparent Right Ascension, reckoned from the *mean equinox*; or, in other words, the interval, expressed in sidereal time, which would elapse between the transit of the mean equinox and that of the star.

The corrections given in Tables II. and III. for one hour are within a second of those for the next, and may be used with or without interpolating for the stars which lie between them.

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The numbers used in forming Table II. were those of the *Nautical Almanac* for 1866; and for Table III. the longitude of the Moon's node was taken from the N.A. for 1874 as 41° 58′·7 at midnight on Jan. 1, 1874, and the annual diminution of its longitude as 19° 20′·5 from the British Association Catalogue. In computing these two Tables, it did not seem worth while to convert the sidereal time into mean solar time, since the difference could never amount to ·02 sec.

Returning now to α and δ, or the mean Right Ascensions and Declinations of the stars for the beginnings of the years,

α and δ will be found, as in other Catalogues, from Table IV. Table IV. differs, however, from Catalogues arranged for astronomical purposes in giving the Right Ascensions of the stars not in arc, or sidereal time, but in mean solar time; as is usual in most English Catalogues, the North Polar Distance is given instead of the Declination. The mean Right Ascension of a star expressed in mean solar time for the commencement of any year, say $1875 + y$, is to be found by adding to the mean R.A. for 1875 the Annual Variation multiplied by y; and where greater accuracy is required, combining also the Sec. Var. $\times y^2 \div 200$.

If, then, we thus take the R.A. from Table IV., and add to it the tabular results from Tables II. and III., and deduct the 11 seconds, we have in mean solar time the interval between the transit of the mean equinox and the apparent transit of the star; and adding from Tables I., I*a*., and I*b*. the time of the transit of the mean equinox, we have the mean solar time of the apparent transit of the star.

It will, perhaps, be convenient here, and before describing the construction of Table IV., to point out a ready way of using these Tables with the small fixed telescope.

Since Table IV. contains most of the stars likely to be satisfactorily observed with a small telescope, the observer need not examine the book to see what stars to look for before taking the observations; it will be sufficient to observe three or four stars, and recording the observations to identify the stars afterwards.

The fixed telescope will, in general, have a sensible error, and the error will continue the same so long as the telescope remains unmoved. Thus, supposing the fixed telescope should point a little to the west of the meridian, the stars would not pass it so soon as they pass the meridian; and, in utilising the observations, this difference in time would have to be taken into account. It will be best done by combining the difference, or instrument correction, with the equinox correction for the year given in Table I*a*.; the combination should also be diminished by the 11 seconds artificially inserted in Tables II. and III., and this should be treated as the *general correction for the year*. It will also be well to keep a permanent note of the instrument correction, for use in future years.

The general correction for the year should be written down on a paper book-marker, which should be kept in the right place in Table I.

I find it also well worth the trouble to write on the book-marker the days of the week, and opposite them the day letters for the year, thus, for 1875:—

C.	Sunday.
D.	Monday.
E.	Tuesday.
F.	Wednesday.
G.	Thursday.
A.	Friday.
B.	Saturday.

This will frequently enable the day of the month to be ascertained.

Now, having taken the observations, and written them down, find the time for the previous transit of the equinox, by combining the general correction for the year with Table I. The time thus found will be the *general correction for the night*. Next, subtract roughly the general correction for the night from the

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middle time, also taken roughly, of the observation. The remainder will indicate the R.A.s of the stars observed with quite sufficient accuracy to enable the observer to take the proper quantities from Tables II. and III. These should be added to the general correction for the night, and the sum will be the *general correction for the observations.* The stars observed should then be identified, and their mean places brought up to the beginning of the year, and each of these, when added to the general correction for the observations, will give the mean solar time the star passed the wires of the *fixed telescope* on that night. The comparison of that time with the observed time will show the error of the watch or clock.

Should, however, the error of the clock or watch be not known approximately, it would be well, before going to the telescope, to find out from the book when some large or otherwise easily recognised star would pass, and then go to the telescope and watch for and observe it.

Table IV. was thus compiled. The places of the stars contained in it were taken from several Catalogues, generally in the following order of preference: *4 G, 3 G, 2 G, 1 G; 2 R, 1 R, A, 6 B, 7 B, D, 2 H, 1 H; R, K, L, 4 B; M, and W, were only made use of after most of the manuscript was ready for the press. The superiority, however, of these two Catalogues, especially of W., to some of the others, led, in several cases, to the places from W and M being substituted for those in the manuscript.

The places of the stars were brought up from the epochs of their respective Catalogues by the usual formulæ:

$\alpha' = \alpha + (p + \mu)\, y + s y^2 \div 200$ and $\Delta' = \Delta + (p_1 + \mu_1)\, y + s_1 y^2 \div 200$;

where α' and Δ' stand for the mean R.A. and N.P.D. of the star for 1875; α and Δ the same at the epoch of the Catalogue; p and p_1, μ and μ_1, s and s_1, the Geometrical Precessions, Proper Motions, and Secular Variations of the stars in R.A. and N.P.D.; and y, the number of years the epoch of the Catalogue was before 1875. After the stars had been thus brought up to 1875, the sidereal time in which the R.A. was expressed was reduced to mean solar time by *Sang's Time Tables* (Blackwood, 1868), and by *C. F. W. Peters' Tables* (Hamburg, 1871).

The Annual Variations were adapted to 1875 by the Secular Variations, and the Annual Variations in R.A. were reduced from sidereal to mean solar time.

In bringing the places of the stars up to 1875, the Precessions used were, in the case of 4 G, 3 G, 2 R, and W, those of the Catalogues. These Precessions are based upon Peters' elements.

The formulæ for Precession, and the numbers according to Peters, may be thus expressed:—

Precession in R.A. or $p = m + n \sin \alpha \cot \Delta$; and

Precession in N.P.D. or $p_1 = - n \cos \alpha$;

where m in seconds for any year $1800 + y = 3{\cdot}070820 + {\cdot}000019\, y$, and

$\log n$ seconds $= {\cdot}1262548 - {\cdot}0000018{,}69\, y$

$\log n'' = 1{\cdot}3023461 - {\cdot}0000018{,}69\, y$

In accordance with the above formulæ, but using for m and n only 4 and 5 decimals respectively, the Precessions for 6 B, 1 H, R, and 4 B were computed. The Precessions in R.A. of the other Catalogues were increased by ·001 sec., and in N.P.D. were used without alteration.

In dealing with the Proper Motions of the stars, or μ and μ_1, the P.M.s in the Greenwich Catalogues, which were taken from the Rev. R. Main's and Mr.

* See page c. 72 for the meaning of the abbreviations.

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Stone's papers in the Memoirs of the R.A.S., were adopted without alteration; but those taken from B.A.C., and which consequently had been estimated upon inferior data, were rejected, and re-computed in the following manner. 1st, in the case of stars taken from 4 G, which are also found in B.F., the places in B.F. were brought up, by the trigonometrical formulæ, from 1755 to 1864, and the place so found was compared with that in 4 G, and the P.M. estimated accordingly; and, as an independent check, the P.M.s were computed by solving the two equations:

$a' = a + y\,p + y\,\mu + y^2 s \div 200$, and $\Delta' = \Delta + y\,p_1 + y\,\mu_1 + y^2 s \div 200$, in which μ and μ_1 were the only unknown quantities. These two methods of calculating the P.M.s enabled me to correct my mistakes, showed the general accuracy of the Pres. and Sec. Vars. of 4 G, since the only error so discovered was that the Pre. of 188 should be 3·400 instead of 3·402; and, by confirming each other, showed that in the remaining cases the P.M.s might be calculated without resorting to the trigonometrical formulæ. With reference to these formulæ, it may be sufficient to say that, in order to take advantage of the 'Table of Corresponding Logarithms,' in Carrington's *Catalogue of Circumpolar Stars* (London, 1857), his expressions of those formulæ were adopted, but with the exception that, after altering the meaning of δ from N.P.D. to what it generally stands for Declination, a *small* angle c was found by the differential method, such that $\tan \delta + c$, say tan D, should equal

$$\tan \delta + \cos A\,(1 - \cos \theta) \div \sin \theta.$$

The formula used to find c was $c = \tan \frac{1}{2}\,\theta \cos A \cos^2 \delta$. Tan D was then substituted for tan δ in computing the Precession by the trigonometrical formula. Printed forms, containing the numbers and logs common to all the stars, greatly facilitated the calculations.

The remaining P.M.s were calculated by simpler methods; generally by comparing the actual difference in the star's place in the two Catalogues with its precessional movement, when the precessional movement was calculated on the basis of its Annual Precession, during the interval, being the mean of its precessions (according to Peters) due to its earlier and later places.

The P.M.s found as above were substituted for those in the Catalogues when they had been taken from B.A.C. In a very few cases I have assigned P.M.s to other stars where it seemed probable that such existed. Other P.M.s have been taken from 7 B. All the P.M.s were combined with the precessions of the stars, and form their Annual Variations.

The Secular Variations in the Precessions, but only to three places of decimals, were taken without alteration from 4 G, 3 G, and 2 R. Some slight alterations were made in those of 2 G, 1 G, 1 R, and A, to make them include the change in the values of m and n (see introductions to 4 G, 3 G, and 2 R). These alterations, and the remaining Sec. Vars., were taken from Table VI.

This Table was made before I knew of the facilities for computation to be found in 7 B, and the calculations were made in the following manner:—

For every 5° R.A., and for 36° and 41° Dec., a and δ were brought up to a' and δ' by $100\,p$ and $100\,p_1$; p' and p'_1 were then calculated for a' and δ', with the change in the values of m and n, according to Peters. Then $p' - p$ and $p'_1 - p_1$, after some slight correction had been made in them to compensate for the omission of Sec. Vars. in bringing up a and δ to a' and δ', are represented by the tabular results in Table VI. for every 20 minutes; the intermediate results were obtained by interpolation. The Table is more than sufficiently accurate to use with 3-decimal Precessions.

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EXPLANATION OF COLUMNS IN TABLE IV.

Col. 1. The first figure and letter, or letters, give the abbreviation of the name, given in this book, to the Catalogue from which the star's place is taken. When the abbreviation has 1, 2, 3, or 4 *letters*, it shows that the R.A. of the star depends upon less than 2, less than 4, less than 8, 8 or more observations. ‡ indicates an imperfect observation. The number following the letters is the number of the star in the Catalogue. When the number is followed by the abbreviation of the name of another Catalogue, it shows that the two Catalogues agree in R.A. to ¼ second; but when the second abbreviation is followed by the sign + or − and a decimal point and figure, it shows that the R.A. in the second Catalogue differs from that of the first by the time represented by the sign and the decimals of a second shown by the figure (in some cases it will be seen that the difference amounts to a second, or more). In page *c.* 2, the letters and figures K. 1312 L. for the first star in Table IV. show that its R.A. depends upon one observation in K., where its number is 1312, and that its R.A. in L. does not differ ¼ second from that in K. The letters and figures for the sixth star, Ko. 1378 L.−·3, show that its R.A. depends upon two or three observations in K., where its first number is 1378, and that its R.A. in L. is about three-tenths of a second less than that in K. Speaking generally, the first Catalogue is the best, and the second the next best, in which the star is found; but with the following exceptions:—

I have not used one Greenwich Catalogue to confirm another Greenwich Catalogue. When G. agreed with 1 R. to ¼ second, which can be seen by inspection in 1 R., I did not think it necessary to seek for any other or better confirmation of the place; and though in some cases W. stands in the second place with a sign that it differs from the first Catalogue, W.'s R.A. is generally the better of the two. In some places the R.A. in the first Catalogue is compared with mean of two or more Catalogues.

Col. 2 gives the magnitude of the star, generally taken either from 4 B, or from the Catalogue from which the star's place is taken.

Col. 3 gives the R.A. of the star for Jan 1, 1875, and when the R.A. for any other year 1875 + y is required, it is to be found by adding the seconds and decimals of Annual Variation from col. 5, multiplied by y, to the R.A. in col. 3; and where greater accuracy is required, combining with the place so found the decimals of a second, from col. 6, multiplied by $y^2 \div 200$.

Col. 7 gives the North Polar Distance of the star for Jan. 1, 1875, and the N.P.D. for any year 1875 + y is to be found by combining the N.P.D from col. 7 with the seconds and decimals of arc in col. 8, multiplied by y; and where required, the decimals of a second of arc in col. 9, multiplied by $y^2 \div 200$. The + or − signs will be found at the tops of the 5th, 6th, 8th and 9th cols.

The blank column has been left for notes. In connection with this I may as well mention that the Radcliffe and Chicago Observatories are engaged upon this portion of the heavens.

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In the notes at the ends of the hours, the letters P.M. stand for Proper Motion.

In the case of Double Stars, here called Duplex or Dup., the thick figures represent the magnitudes of the stars, the small figures between them their angular distance from each other, and the last figures the position which the star printed second bears to the first, when the 0 or 360 stands for the north, 90° for the east, 180° for the south, and 270° for the west. When, as in page c. 8, the word *second* occurs, it does not mean the second star as *printed*, but that the second star to pass the meridian is the star given in the Table. The descriptions of the double stars have been taken from Σ.

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EXPLANATION OF THE ABBREVIATIONS OF THE NAMES OF BOOKS.

A.	Armagh. Places of 5,345 Stars. By Rev. T. R. Robinson. Epoch 1840. Dublin, 1859.
4 B.	Bonn. Astronomische Beobachtungen auf der Sternwarte zu Bonn. Von Dr. F. W. A. Argelander. Vierter Band. Epoch 1855. Bonn, 1861.
6 B.	Bonn. Ditto. Sechster Band. Epoch 1855. Bonn, 1867.
7 B.	Bonn. Siebenter Band. Bonn, 1869.
B.A.C.	British Association Catalogue of Stars. Epoch 1850. London, 1845.
B.F.	Fundamenta Astronomiæ deducta ex Observationibus James Bradley, auctore F. W. Bessel. Epoch 1755. Königsberg, 1818.
D.	Dorpat. Stellarum Fixarum. . . . Positiones Mediæ. . . . ex Obs. Mer. in Specula Dorpatensi. Auctore F. G. W. Struve. Epoch 1830. St. Petersburg, 1852.
G.	Groombridge's Catalogue of Circumpolar Stars. Epoch 1810. London, 1838.
1 G.	Greenwich Catalogue of 2,156 Stars. Epochs 1840 and 1845. London, 1849.
2 G.	Ditto 1,576 1850 1856.
3 G.	Ditto 2,022 1860
4 G.	Ditto 2,760 1864
1 H.	Hamburg. Mittlere Oerter von (12,000) Fixsternen abgeleitet aus den Beobachtungen auf der Hamburger Sternwarte. Von Carl Rümker. Epoch 1836. Hamburg, 1843 &c.
2 H.	Neue Folge ditto Epoch 1850. Hamburg, 1859.
K.	Königsberg. Positiones Mediæ Stellarum Fixarum in Zonis Regiomontanis a Besselio . . . . auctore M. Weisse, frequently called Weisse's Bessel, W.B. Epoch 1825. St. Petersburg, 1863.
L.	Lalande's Catalogue of Stars. By the British Association. Epoch 1800. London, 1847.
cL.	Ditto, corrected in 7 B.
M.	Madras. A Catalogue of Fixed Stars, from Observations made at Madras by T. G. Taylor. Epoch 1835. Madras, 1844.
P.	Piazzi Præcipuarum Stellarum Inerrantium Positiones Mediæ. Epoch 1800. Palermo, 1814.
R.	Rome. Memorie del Osservatorio del Collegio Romano. Epoch 1860. Rome, 1859.
1 R.	Radcliffe Catalogue of 6,317 Stars. Epoch 1845. Oxford, 1860.
2 R.	2nd Radcliffe Catalogue of 2,386 Stars. Epoch 1860. Oxford, 1870.
W.	Washington. Catalogue of Stars observed at Washington. Epoch 1860. Washington, 1873.
Σ.	Struve. Stellarum Duplicium et Multiplicium. Mensuræ Micrometricæ. Auctore F. G. W. Struve. St. Petersburg, 1837.

THE END.

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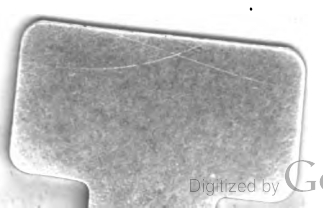
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